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The Impact Of Word-Study Intervention Strategies On Students' Measures Of Reading Comprehension And Fluency

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THE IMPACT OF WORD-STUDY INTERVENTION STRATEGIES ON STUDENTS' MEASURES OF READING COMPREHENSION AND FLUENCY

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ABSTRACT

Despite the existing research regarding effective word-study interventions for struggling adolescent readers, various researchers propose a need for additional research on effective reading interventions to confirm and extend existing knowledge. The current study specifically investigates the impact of the overt/covert and outside-in word-study instructional intervention strategies on struggling adolescent readers' fluency and comprehension measures. Paired samples *t*-tests revealed a significant difference in the pretest and posttest fluency scores of participants receiving either overt/covert or outside-in word-study strategy instruction. However, no significant difference occurred between participants' pretest and posttest comprehension scores. Additionally, ANCOVA statistical analyses revealed no significant differences between the fluency and comprehension scores of participants receiving either overt/covert or outside-in word-study instructional interventions. Because participants' fluency increased significantly after receiving nine weeks of either overt/covert or outside-in word-study instructional interventions, this study concludes that word-study strategy instruction has the potential to help build the fluency bridge that connects decoding and comprehension. With possibly more time and intervention, participants' comprehension could also improve.

DEDICATION

This work is dedicated to

the source of my help and strength

and

my mother

Carolyn Cook

as a fulfilled promise.

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discouraging days. I completed this dissertation with the hope that Taylor and Tristan will know that knowledge is power, and they too can accomplish their God-given dreams.

PREFACE

This dissertation is the original independent work by the author, T. Weekley.

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CHAPTER 1

Introduction

The Research Problem

The United States is in the midst of an adolescent literacy crisis (Flanigan, Templeton, & Hayes, 2012; Deshler, Palincsar, Biancarosa, & Nair, 2007; Biancarosa & Snow, 2006). Seventy percent of American students in grades four through twelve strive to read on grade level and may be thousands of words behind normal achieving peers in acquired vocabulary or word knowledge (Flanigan et al., 2012; Stahl & Nagy, 2006; Nagy, Berninger, & Abbott, 2006). For example, average kindergarteners acquire approximately 4,300 words by the completion of their kindergarten year and average high school students acquire approximately 40,000 words upon graduation; however, the vocabularies of struggling readers are significantly lower than non-struggling readers' vocabularies from kindergarten through high school (Flanigan et al., 2012; Stahl & Nagy, 2006; Biemiller & Boote, 2006; Nagy & Anderson, 1984). The gap between struggling and non-struggling readers related to word knowledge increases each year as lower achieving students are exposed to fewer words during grades four through twelve (Bohrnstedt, Kitmitto, Ogut, Sherman, & Chan, 2015; Flanigan et al., 2012; Stahl & Nagy, 2006; Biemiller & Boote, 2006; Hart & Risley, 1995). The National Assessment of Educational Progress (NAEP, 2015) demonstrates the gap in word knowledge and overall reading proficiency by reporting two-thirds of fourth, eighth, and twelfth grade students nationwide scored below the proficiency level in reading on the 2015 assessment. Seventy-four percent of fourth, eighth, and twelfth

grade students in Mississippi scored below the proficiency level on the 2015 assessment (NAEP, 2015). These NAEP (2015) results support the notion that students lacking reading proficiency by fourth grade are at a greater risk of falling farther behind academically; therefore, it is imperative for students in grades four through twelve to acquire reading proficiency in order to increase their likelihood of obtaining academic achievement and graduation (Bohrnstedt et al., 2015; Aud, Wilkinson-Flicker, Kristapovich, Rathbun, Wang, & Zhang, 2013).

Reading proficiency and graduation. Reading proficiency consists of decoding words, reading words fluently, understanding the meanings of words, and comprehending words within text (Honig, Diamond, & Gutlohn, 2013; Moats & Tolman, 2009; Boardman et al., 2008; Glaser & Moats, 2008) and is necessary for high school graduation, postgraduate success, and economic equality (Adams, 2015; Balfanz et. al., 2014; Dupree et al., 2013; Venzia & Jaeger, 2013; Hirsch, 2013). With two-thirds of students classified as lacking proficiency on the 2015 NAEP, research supports that reading proficiency affects high school graduation while high school graduation affects college graduation (Adams, 2015; Hernandez, 2012; Joseph & Schlier, 2008). Both high school and college completion affect employment opportunities (Waldman, 2016; Adams, 2015; Hirsh, 2013; Hernandez, 2012; Fall & Roberts, 2012). More than eight million middle and high school students are struggling readers and are at risk of dropping out of high school (Adams, 2015; Hernandez, 2012; Hirsh, 2013; Joseph & Schlier, 2008). Students who drop out of high school are at a greater risk for a lifetime of poverty than students who obtain a high school diploma (Camille & Bauman, 2016; Stester & Stillwell, 2014; Stillwell & Stable, 2013; Hernandez, 2012; Fall & Roberts, 2012). It is imperative for adolescents to obtain the reading skills necessary for high school completion, college admission, and future employment opportunities (Hanes, 2016; Adams, 2015; Stester & Stillwell, 2014; Hernandez, 2012). Because

reading proficiency is critical for student success, educators seek ways to help readers develop reading proficiency by increasing students' fluency and comprehension (Scammacca, Roberts, Vaughn, Stuebing 2015; Deshler et al., 2007; Moore & Kinchman, 2006).

Recommendations for improving reading proficiency and current study. In order to improve reading proficiency, various researchers recommend utilizing word-study strategy instructional interventions in combination with fluency, comprehension, computer-based programs, and motivational components through Response to Intervention (RtI) (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2012; Lovett et al., 2012; Edmonds et. al., 2009; Slavin et al., 2008). RtI is a three-tier model that provides students with quality classroom instruction and necessary interventions (RtI Network, 2016; Hougen, 2014; Vaughn & Fletcher, 2012; Vaughn, Cirino,Wanzek, Wexler, Fletcher, & Denton, 2010; Vellutino, Tunmer, Jaccard, & Chen, 2007). This current study focuses on the word-study component of the recommended intervention bundle. Word-study instructional strategy interventions provide students with the tools to develop decoding and word recognition skills (Kundert et al., 2012; Ebbers, 2011; Slavin et al., 2008; Vaughn et al., 2010). Decoding, the ability to recognize printed words, has an impact on reading fluency (Rasinski, 2010; Rasinski, Rikli, & Johnston, 2009; Moats, 2009a). Fluency impacts vocabulary (word knowledge), and vocabulary affects comprehension; therefore, fluency is a link between decoding and comprehension (Hougen, 2014; Boardman et al., 2008; Moats & Hennessy, 2009; Glaser & Moats, 2008). This current study investigates two word-study strategies, overt/covert as developed by Archer, Gleason, and Vachon (2005) and outside-in originally developed by Ebbers & Denton (2008) and enhanced by Ebbers (2011). These strategies are designed to enhance students' abilities to decode multisyllabic words and could

affect struggling adolescent readers' fluency and comprehension measures by providing them with the tools to enhance their word recognition skills. An increase in word recognition, fluency, and comprehension could ultimately lead to struggling readers' improved reading proficiency (Hougen, 2014; Glaser & Moats, 2008; Moats & Hennessy, 2009; Torgesen et al., 2007; Archer, Gleason, & Vachon, 2003).

Background

Shift in reading instruction after third grade. Until third grade, most reading instruction focuses on learning to read. When reading instruction shifts from learning to read to reading to learn, students must read and comprehend complex texts containing multisyllabic words and difficult concepts (Honig et al., 2013; Moats & Tolman, 2009; Christenbury, Bomer, & Smagorinsky, 2009; Diliberto, Beatie, Flowers & Algozine, 2009). Middle School students who have not mastered decoding skills struggle to read and understand words with multiple syllables and likely are not fluent readers or good comprehenders (Hougen, 2014; Moats & Hennessy, 2009; Moats, 2009; Joseph & Schlier, 2008).

Poor readers and decoding. In contrast to good readers who effortlessly break long words into parts, poor readers often inaccurately identify multisyllabic words by processing letters rather than syllables (Rosenthal & Ehri, 2011; Glaser & Moats, 2008; Moats, 2005; Bhattacharya & Ehri, 2004). In order for students to determine the meanings of words, they need to be able to decode the words correctly (Palumbo et al., 2015; Carlisle & Stone, 2005). As a result, many struggling readers need word study strategies to aid them in determining the sounds, structures, and meanings of words. When students are able to determine the sounds, structures, and meanings of words, they have a greater chance of increasing their reading fluency and

improving their comprehension (Honig et al., 2013; Chard, Pikulski, & McDonagh, 2012; Rasinski, 2010; Barth, Catts, & Anthony, 2009; Vellutino et al., 2007; Catts & Weismer, 2006).

Word study strategy instruction. Word study strategy instruction plays a vital role in students' development of decoding skills that could lead to an increase in reading fluency and comprehension (Mullaney et al., 2014; Kundert et al., 2013; Graves et al., 2011; Vaughn et al., 2010; Shippen et al., 2005). Word-study strategy instruction yields effective results relating to fluency and comprehension when taught explicitly and systematically (Hougen, 2014; Honig et al., 2013; Slavin et al., 2008). Older struggling readers need instruction that covers advanced morphological and orthographic knowledge in addition to simple phonics instruction (Rosenthal & Ehri, 2011; Moats, 2009a). Honig et al. (2013) suggest that students struggling to read multisyllabic words need to be assessed to determine if the problem is due to the inability to decode single syllable words. If students are unable to decode single syllable words, they need additional phonics instruction (Ehri, 2014; Moats & Tolman, 2009; Moats, 2009a; Boardman et al., 2008; Glaser & Moats, 2008; Ehri, 2005). If readers are able to decode single syllable words, they likely need instruction that focuses on multisyllabic word reading (Hougen, 2014; Ebbers, 2011; Ebbers & Denton, 2008; Archer, Gleason, & Vachon, 2005). Many struggling adolescent readers fall into this category (Christenbury et al., 2009; Torgesen, Houston Rissman, Decker, Roberts, Vaughn, & Lesaux, 2007). Intensive instruction in word-study strategies could significantly improve reading fluency (Hasbrouck & Hougen, 2014; Chard et al., 2012; Rasinski, Reutzel, Chard, & Linan-Thompson, 2011; Barth et al., 2009). When reading fluency increases, students are able to develop automaticity or the ability to pronounce words automatically (Alvermann, Unrau, & Ruddell, 2013; Bhattacharya & Ehri, 2004) and devote more cognitive energy to comprehension (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010;

Wharton-McDonald & Swiger, 2009). Adequate reading comprehension skills enhance the likelihood for students to achieve at high academic levels. When students achieve at higher levels, they are less likely to drop out of high school and more likely to experience post-graduate success (Vaughn et al, 2012; Graves et al., 2011; Vaughn et al., 2010).

Purpose

The intent of this experimental study is to determine the impact of struggling adolescent readers' use of two word-study intervention strategies (overt/covert or outside-in) on their fluency and comprehension scores.

Research Questions

1. What is the impact of the use of overt/covert word-study strategies on struggling adolescent readers' fluency scores?
2. What is the impact of the use of overt/covert word-study strategies on struggling adolescent readers' comprehension scores?
3. What is the impact of the use of outside-in word-study strategies on struggling adolescent readers' fluency scores?
4. What is the impact of the use of outside-in word-study strategies on struggling adolescent readers' comprehension scores?
5. Is there a significant difference between the fluency scores of students who receive overt/covert word-study interventions compared to students who receive outside-in word-study interventions?
6. Is there a significant difference in the comprehension scores of students who receive overt/covert word-study interventions compared to students who receive outside-in word-study interventions?

Justification of the Study

This current study investigates the impact of students using the overt/covert (Archer et al., 2005) or outside-in (Ebbers, 2011) word-study strategies on students' fluency and comprehension scores. This study adds to scholarly research by providing additional information on the effectiveness of the overt/covert and outside-in word-study interventions. This study improves teaching practice by providing evidence regarding the use of overt/covert and outside-in word-study strategies and providing optional intervention tools for educators to use. This study could improve policy by addressing the struggling adolescent literacy problem. If the strategies are effective, they could potentially aid in closing the reading gap between proficient and non-proficient readers. When non-proficient readers' fluency increases, reading becomes more automatic and allows more time and energy to be devoted to comprehension (Chard et al., 2012; Rasinski, 2010; Barth et al., 2009; Vellutino et al., 2007; Catts & Weismer, 2006; Ehri, 2005). When struggling readers' comprehension abilities improve, they are more likely to experience improved academic achievement. When more struggling readers are more successful academically, they are more likely to finish high school and possibly increase overall graduation rates in schools (Waldman, 2016; Adams, 2015; Hirsh, 2013; Joseph & Schlier, 2008).

Conceptual/Theoretical Framework

Gough and Tumner's (1986) Simple View of Reading (SVR) and Scarborough's (2001) Rope Model serve as the theoretical basis of this study. Both models demonstrate the necessary components for skilled reading (word recognition and language comprehension). Although both models demonstrate essential components for skilled reading, struggling readers often exhibit deficiencies in the various components portrayed in the models (Honig et al., 2013; Moats & Tolman, 2009; Moats & Davidson, 2009; Moats & Hennessy, 2009).

The Simple View of Reading. Gough and Tumner's (1986) SVR theory suggests that decoding and language comprehension are necessary components for skilled reading (Gough & Tumner, 1986) and reading comprehension is the product of word recognition (decoding) and language comprehension (RC=WR x LC) or (R= D x LC). Printed word recognition (decoding) consists of phoneme awareness and phonics while language comprehension involves the ability to obtain meaning from spoken words. Language comprehension differs from reading comprehension because language comprehension is derived from oral language while reading comprehension relies on print (Catts & Weismer, 2006). According to the SVR, the necessary complex skills and knowledge for successful reading fit in the word recognition (decoding) or language comprehension categories (Hoover & Gough, 1990; Gough & Tumner, 1986). Students display deficits in decoding when they are unable to accurately read printed words. Students demonstrate deficits in language comprehension when they lack the ability to use higher order thinking skills such as imagining, interpreting, or reasoning (Farrell, Davidson, Hunter, and Osenga, 2010). Adequate decoding skills and language comprehension abilities are necessary for proficient reading (Gough & Tumner, 1986; Hoover & Gough, 1990).

Scarborough's Rope Model. The Rope Model (Scarborough, 2001), displayed in Figure 1.1, proposes that many strands are woven into skilled reading. Language comprehension consists of background knowledge, vocabulary knowledge, language structures, verbal reasoning, and literacy knowledge while word recognition consists of phonological awareness, decoding, and sight word recognition. Once intertwined, these ropes result in skilled reading consisting of fluent word recognition and text comprehension. The language comprehension strategies become increasingly strategic while the word recognition strategies become

increasingly automatic with time. The ultimate goal is to produce skilled readers (Scarborough, 2001).

Figure 1.1 Scarborough's Rope Model

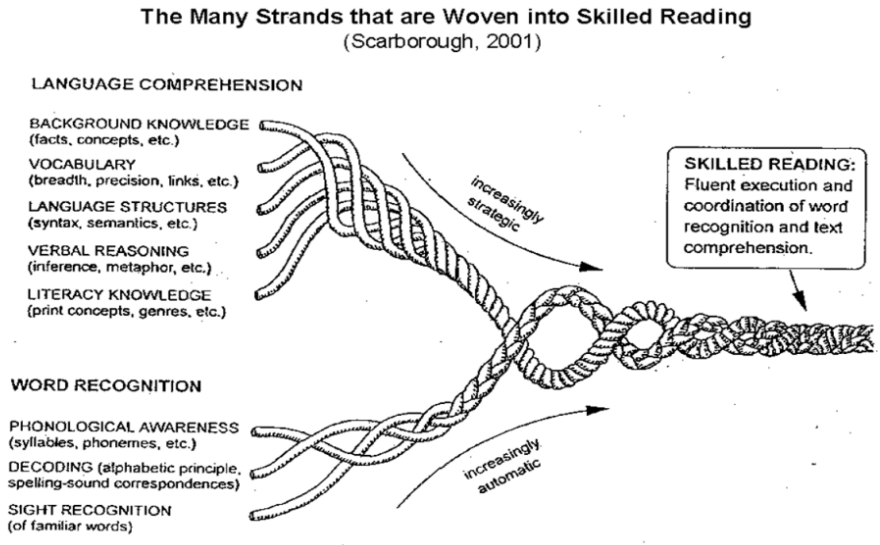

Figure 1.1. Scarborough's Rope Model reveals the many strands that are woven into skilled reading. Image originally printed in the *Handbook for Research in Early Literacy* (pp. 97-110). Scarborough, H. S. (2001). New York, NY: Guilford. Reprinted with permission.

Relationship between current study and theoretical models. The current study relates to the SVR because it focuses on strategies designed to teach students to decode multisyllabic words. The ultimate goal of the word-study strategy instruction is to provide readers with the tools to decode words. Decoding words develops word recognition skills, which could increase fluency and comprehension abilities (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010; Wharton-McDonald & Swiger; 2009). Because struggling adolescent readers are generally deficient in word recognition, it is imperative to teach them strategies to help them decode multisyllabic words (Honig et al., 2013; Chard et al., 2012; Rasinski et al, 2011; Barth et al.,

2009; Kirby & Salvage; 2008). As readers develop their abilities to decode multisyllabic words, they should develop automaticity (Alvermann et al., 2013; Moats & Davidson, 2009; Bhattacharya & Ehri, 2004). Once reading fluency increases via automaticity, readers are able to devote less cognitive energy toward decoding and more cognitive energy toward comprehension (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010;Wharton-McDonald & Swiger; 2009). When students are able to recognize words (WR) and understand what they read (LC), they exemplify the ultimate goal of the SVR, reading comprehension (RC=WR x LC) (Gough & Tumner, 1986; Hoover & Gough, 1990).

This study also relates to the Rope Model (Scarborough, 2001) because readers must develop word recognition skills (phonological awareness, decoding, and sight recognition) in addition to language comprehension skills (background knowledge, vocabulary knowledge, language structures, verbal reasoning, and literacy knowledge) to become skilled readers. The Rope Model stresses the intertwining of word recognition and language comprehension skills to produce skilled reading consisting of fluent reading and comprehension of texts.

This current study focuses on the usage of two word-study strategies within a bundled intervention approach consisting of fluency, comprehension, computer-based, and motivational components. The bundled intervention approach provides students with the instruction leading to the development of word recognition (decoding) and language comprehension through the application of overt/covert (Archer et al., 2005) or outside-in (Ebbers, 2011) word-study strategies. Development of word recognition (decoding) and language comprehension provides students with skills to become proficient readers according to Gough & Tumner's SVR (1986) and Scarborough's (2001) Rope Model. This study supports the basis of the SVR (Gough & Tumner, 1986) and the Rope Model (Scarborough 2001) by investigating the impact of the use of

overt/covert (Archer et al., 2005) and outside-in (Ebbers, 2011) word-study strategies on struggling adolescent readers' fluency and comprehension scores.

Limitations of the Study

The study has several limitations including the sample size, the research site, the length of the data collection period, and the knowledge of the one administering the word-study instructional strategy interventions. The sample consists of one group of adolescent readers in a rural North Mississippi school, which may not be representative of all of the students and schools in Mississippi and the rest of the United States. Since data collection spans a nine-week period, results may vary if information is collected over a longer or shorter period. The knowledge and proficiency of the one administering the word-study strategy instructional interventions could impact participants' performance because proficient knowledge in administering the overt/covert and outside-in word-study instructional strategy interventions is necessary for students to receive quality instruction to master the word-study skills.

Dissertation Organization

This dissertation is organized in a traditional format (Joyner, Rouse, & Glatthorn, 2012) consisting of five chapters. Chapter one provides the general background of the study, purpose statement, significance of the problem, key terms, and limitations while chapter two offers a review of the literature relating the current research to previous research. Chapter three describes the methodology, participants, procedures, and data analyses while chapter four explains the results. Chapter five concludes the dissertation with a summary of the results and a discussion of findings.

Definition of Terms

Adolescents are youth occupying the unique space between childhood and full adulthood (Christenbury et. al., 2009).

Decoding is the ability to change the letters and sounds in words from print to speech (Hong et. al., 2013).

Comprehension involves vocabulary knowledge (understanding and using words in speaking, listening, and writing) and understanding text (Honig et al., 2013; Boardman et al., 2008; Glaser & Moats, 2008; Moats, 2009a; NRP, 2000).

Covert strategies encourage readers to look for prefixes, suffixes, and vowels, say the parts of the word, say the whole word, and make it a real word (Archer et al., 2005).

Easy Curriculum Based Measurements (easyCBM) includes an oral reading fluency (ORF) assessment to determine the number of words students read correctly in one minute (Anderson, Alonzo, &Tindal, 2014).

Fluency is reading words in an effortless and automatic manner with accuracy at a suitable rate with proper prosody that leads to accurate and meaningful comprehension and motivation to read (Honig et al., 2013; Hasbrouck & Glaser, 2012; Rasinski, 2010; Barth, Catts, & Anthony, 2009; Fletcher, Lyon, Fuchs & Barnes, 2007; Boardman et al., 2008; Moats, 2009a; NRP, 2000).

Literacy is a "lifelong continuum of experiences with the processing, interpretation, and production of texts of all sorts" (Christenbury et. al, 2009).

Multisyllabic words refer to words of two or more syllables (Honig et al., 2013).

Outside-in strategy uses context and morphological clues to identify word parts and infer word meanings (Ebbers, 2011).

Overt strategies show students how to divide words into syllables circling prefixes and suffixes, underlining the vowels, saying the parts of the word, saying the whole word, and making it a real word (Archer et al., 2005).

Renaissance STAR Reader is a predictive program of students' foundational skills, reading informational and fictional text, and language development (STAR, 2014).

Response to Intervention (RtI) is a three-tier model identification and prevention model for students with instructional and behavioral needs (RTI Network, 2016).

Struggling adolescent readers belong to strategic and intensive groups of learners. Strategic learners are below grade level but are able to make progress with targeted assistance while intensive learners are significantly below grade level and require extensive concentrated interventions (Honig et al., 2013).

Vocabulary through Morphemes (VTM) uses context and morphological clues to infer word meanings (Ebbers, 2011).

Word recognition comprises phonological awareness (syllable, phonemes, etc.), decoding (alphabetic principle, spelling-sound correspondence), and sight recognition (of familiar words) (Scarborough, 2001).

CHAPTER 2

A Review of the Literature

Decoding is a foundational component in the reading process because reading fluency and comprehension are dependent upon the reader's ability to decode and recognize words in texts (Hougen, 2014; Boardman et al., 2008; National Reading Panel, 2000; Hoover & Gough, 1990). When reading instruction shifts from learning to read to reading to learn, students must read and comprehend complex texts containing multisyllabic words (Honig et al., 2013; Moats & Tolman, 2009; Christenbury et al., 2009; Diliberto et al., 2009). Twenty-five to forty percent of struggling readers lack word recognition skills and struggle to decode words with multiple syllables (Murray, 2016; Hougen, 2014; Moats, 2009; Joseph & Schlier, 2008). Many struggling readers need word-study strategy instructional interventions to aid them in decoding multisyllabic words (Scammacca et al., 2015; Hougen, 2014; Moats, 2009; Boardman et al., 2008). When struggling readers receive word-study strategy interventions, they have a greater chance of developing the decoding and word recognition skills necessary to increase their reading fluency and text comprehension (Honig et al., 2013; Chard et al., 2012; Rasinski, 2010; Barth et al., 2009; Vellutino et al., 2007; Catts & Weismer, 2006). Because word-study strategy interventions are necessary for struggling adolescent readers to develop decoding and word recognition skills, various researchers propose a need for future research on reading interventions to confirm and extend existing knowledge of effective interventions (Scammacca et al., 2015; Solis et al., 2014; Wanzek et al., 2013; Vaughn et al., 2012; Lovett et al., 2011).

This chapter provides an extensive review of the literature regarding word-study intervention strategies for struggling adolescent readers. In addition, the chapter includes the topics of the reading process, the theoretical framework forming the basis of this current study, characteristics of struggling readers, and two specific word-study intervention strategies designed to equip struggling adolescent readers with tools to decode multisyllabic words. This literature review provides evidence of gaps in empirical literature and concludes with a summary of the major themes in this review.

The Reading Process

Because reading fluency and comprehension are vital for adolescents' reading proficiency, it is important to understand the role of decoding in relation to fluency and comprehension in the reading process. While accurate word reading, fluency, and comprehension are components of successful reading (Hougen, 2014; Honig et al., 2013; Boardman et al., 2008; Glaser & Moats, 2008), the process of reading consists of two basic domains, decoding and comprehension (Glaser & Moats, 2008; Hoover & Gough, 1990; Gough & Tumner, 1986). Decoding, the first domain, includes phonological awareness, phonics, and dividing words into smaller parts (Honig et al., 2013; Boardman et al., 2008; Glaser & Moats, 2008; Moats, 2009a; NRP, 2000). The National Reading Panel (NRP, 2000) describes phonological awareness as the ability to hear sounds in words often demonstrated through rhyming, blending sounds to make words, and segmenting words into separate sounds. The NRP (2000) describes phonics as the recognition of the relationship between letters and sounds and understanding that the combination of letters and sounds makes words. Word-study strategies provide readers with tools to divide words into smaller parts, and dividing words into smaller parts helps readers decode words (Hougen, 2014; Honig et al., 2013; Archer et al., 2005).

Comprehension, the second domain, involves vocabulary knowledge (understanding and using words in speaking, reading, listening, and writing) and understanding text (Honig et al., 2013; Boardman et al., 2008; Glaser & Moats, 2008; Moats, 2009a; NRP, 2000). Comprehension also enables the reader to gain meaning from text and mend misunderstandings when they occur (Honig et al., 2013, Boardman et al., 2008; Moats, 2009a; NRP, 2000). Fluency is the ability to decode words in an effortless and automatic manner with reasonable accuracy at a suitable rate with proper prosody that leads to accurate and meaningful comprehension and motivation to read (Honig et al., 2013; Hasbrouck & Glaser, 2012; Rasinski, 2010; Barth et al., 2009; Fletcher, Lyon, Fuchs & Barnes, 2007, Boardman et al., 2008; Moats, 2009a; Moats & Hannessy, 2009; NRP, 2000). Fluency serves as a bridge linking decoding skills to comprehension skills (Honig et al., 2013; Moats & Tolman 2009d; Glaser & Moats, 2008) and is a vital connection between decoding, word recognition, and comprehension of texts (Hasbrouck & Hougen, 2014; Honig et al., 2013; Chard et. al, 2012; Moats & Davidson, 2009).

Figure 2.1. Hierarchy of Comprehension

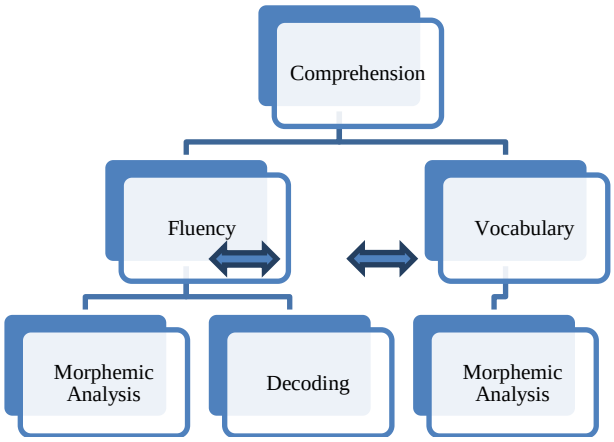

Figure 2.1. Displays the components forming the hierarchy of comprehension.

Reading comprehension is a complex process dependent upon reading fluency and vocabulary knowledge as demonstrated in Figure 2.1 (Honig et al., 2013; Moats & Tolman, 2009; Moats & Hennessy, 2009; Boardman et al., 2008). The figure indicates that decoding builds fluency, and morphemic analysis is a skill that impacts decoding, fluency, and vocabulary development (Chard et al., 2012; Ebbers, 2011; Moats & Davidson, 2009; Ebbers & Denton, 2008). Because decoding, the first domain in reading, is linked to morphemic analysis, fluency, vocabulary, and comprehension (the second domain in reading), decoding is a foundational skill in the reading process and is vital for reading proficiency (Hougen, 2014; Honig et al., 2013; Moats & Tolman, 2009; Moats & Hennessy, 2009; Ebbers & Denton, 2009; Boardman et al., 2008).

Decoding. Because decoding is a foundational skill in the reading process and is necessary for successful reading, it is important to discuss aspects of decoding. These aspects include the role of phonics in decoding, the relationship between automatic word recognition, morphological awareness, and fluent reading. Beginning readers must connect letter knowledge (orthographic information) with sound knowledge (phonological information) to form words (decoding) (Adams, 1990). Connecting printed and spoken forms of words allows readers to access the word's meaning (semantic processing). Decoding is essential for comprehension because recognizing the orthographic and phonological forms in addition to the rest of the context provided in the text allows the reader to understand the text (Moats, 2009b). Reading proficiency is contingent upon reading words accurately and automatically (Glaser & Moats, 2008; Boardman et al., 2008). When readers are automatic decoders, fluent reading is possible and attention may be devoted to comprehension (Honig et al., 2013). The Connecticut Correlational Study (Shaywitz, Escobar, Fletcher, & Makuch, 1992) reveals a strong relationship between

decoding and comprehension. Early decoding ability continues to have a significant impact in the upper grades (Scammacca et al., 2015; Solis et. al, 2012; Moats, 2009b). One's vocabulary expands by reading more texts; therefore, the more one reads, the more words one knows, and the easier it is to decode new words (Glaser & Moats, 2008). For beginning and older struggling readers, decoding skills are taught explicitly through phonics instruction (Scammacca et al., 2015; Honig et al., 2013; Moats, 2009b).

***Phonics*.** Phonics instruction is intended for beginning readers and older struggling readers who have not developed skills to decode words (Boardman et al., 2008). Phonics helps students convert printed words into their spoken forms, a process also known as decoding (Moats, 2009b). Effective phonics instruction develops understanding of the alphabetic principle, incorporates phonemic awareness, provides sufficient practice in reading words, leads to automatic word recognition, and is part of a comprehensive reading program (Honig et al., 2013; Torgesen et al., 2007; Ehri, 2005; NRP, 2000). A vital component of decoding is the ability to blend individual sounds in a word together and come up with a recognizable word (Beck, 2006). Many struggling and at-risk readers need instruction that starts with sounding out words orally and gradually transitions to a stage where students can recognize words automatically without sounding them out (Honig et al., 2013; Bhattacharya & Ehri, 2004). Without automatic word recognition skills, students will not be able to develop reading fluency which needs to be accurate and automatic (Rosenthal & Ehri, 2011).

Automatic word recognition, morphological awareness, and fluent reading. Automatic word recognition and fluent reading are acquired through decoding skills and knowledge of word meanings (morphological awareness) (Honig et al., 2013; Moats, 2009b; Boardman et al., 2008; Torgesen, 2007). Recognition of a new word is easier if the word already has an identity in the

mind of the reader (pronunciation and/or meaning) (Glaser & Moats, 2008). Word recognition can be described using Moats' (2009b) four-part processing model which is based on work by Adams (1990). The model consists of a context processor (surrounding specific words that provide context clues), meaning processor, phonological processor (language input and output) and orthographic processor (reading input and writing output). Phonics bridges phonological and orthographic processors (Moats, 2009b) resulting in word recognition and reading fluency. Once a word is decoded within the orthographic and phonological processors, the meaning processor activates knowledge of word meanings (Hougen, 2014; Moats, 2009b; Glaser & Moats, 2008), and the context processor enables the reader to use the context of the sentence to aid in determining the meaning of words. Morphological awareness also contributes to knowledge of word meanings by allowing the reader to use morphemic clues to determine the meanings of words (Wolten & Gibson, 2015; Wolten & Green, 2013; Hougen, 2014).

Morphological awareness is the knowledge and awareness that complex words are formed with morphemes, the meaningful parts of words (Hougen, 2014; Ebbers & Denton, 2008). The majority of morphemes in English are derived from Greek, Latin, or Anglo-Saxon and are classified as free or bound (Honig et al., 2013; Kirk & Gillon, 2009). Free morphemes are words that stand alone (examples are help, play, run) while bound morphemes must attach to other morphemes to form words (an example is dis-in-form-ed). Morphological awareness also includes an ability to apply morphemic analysis. Morphemic analysis involves decoding words by looking inside the word for roots, prefixes, and suffixes (Ebbers, 2011; Ebbers & Denton, 2008) and applying knowledge of roots and affixes to determine the meanings of words (Hougen, 2014). According to researchers Ebbers and Hougen (2014), Wolten and Green (2013), Ebbers, (2011), and Kirby, Deacon, and Bowers et al., (2011), morphological awareness

improves students' overall reading abilities assisting in students' interpretations of unfamiliar words. Morphological awareness and the ability to decode and recognize words potentially increase a reader's opportunity to read fluently and comprehend text (Murray, 2016; Hougen, 2014; Alverman et al., 2013; Moats, 2009b). However, struggling readers often lack the word recognition skills necessary for fluent reading and comprehension of texts (Hougen, 2014; Christenberry et al., 2009; Boardman et al., 2008; Scammacca et al., 2007). Word recognition is a vital component of the theoretical models discussed in the following section.

Theoretical Models

Two theoretical models, the Simple View of Reading (SVR) (Gough & Tumner, 1986) and Scarborough's Rope Model (Scarborough, 2001) demonstrate the necessary components for skilled reading (word recognition and language comprehension). Because the SVR (Gough & Tumner, 1986) and Scarborough's Rope Model (2001) explain processes that occur during reading and reveal components successful readers should possess, both theories comprise the theoretical basis of the current study. Although both models demonstrate essential components for skilled reading, struggling readers often exhibit deficiencies in the various components portrayed in the models (Honig et al., 2013; Moats & Tolman, 2009; Moats & Davidson, 2009; Moats & Hannessy, 2009).

The Simple View of Reading. Gough and Tumner's (1986) SVR theory suggests that decoding and language comprehension are necessary components for skilled reading (Gough & Tumner, 1986) and reading comprehension is the product of word recognition (decoding) and language comprehension (RC=WR x LC) or (R= D x LC). Printed word recognition (decoding) consists of phoneme awareness and phonics while language comprehension involves the ability to obtain meaning from spoken words. Language comprehension differs from reading

comprehension because language comprehension is derived from oral language while reading comprehension relies on print (Catts & Weismer, 2006). According to the SVR, the necessary complex skills and knowledge for successful reading fit in the word recognition (decoding) or language comprehension categories (Hoover & Gough, 1990; Gough & Tumner, 1986). Students display deficits in decoding when they are unable to accurately read printed words. Students demonstrate deficits in language comprehension when they lack the ability to use higher order thinking skills such as imagining, interpreting, or reasoning (Farrell, Davidson, Hunter, & Osenga, 2010). Adequate decoding skills and language comprehension abilities are necessary for proficient reading (Gough & Tumner, 1986; Hoover & Gough, 1990).

Rose's (2008) model in Figure 2.3 expands the SVR theory by suggesting readers fit into one of four categories: readers with poor word recognition and good comprehension, readers with poor word recognition and poor comprehension, readers with good word recognition and poor comprehension, and readers with good word recognition and good comprehension. The ultimate goal is to move struggling readers to the good word recognition and good comprehension category (Kirby & Salvage, 2008).

Figure 2.2 Simple View of Reading

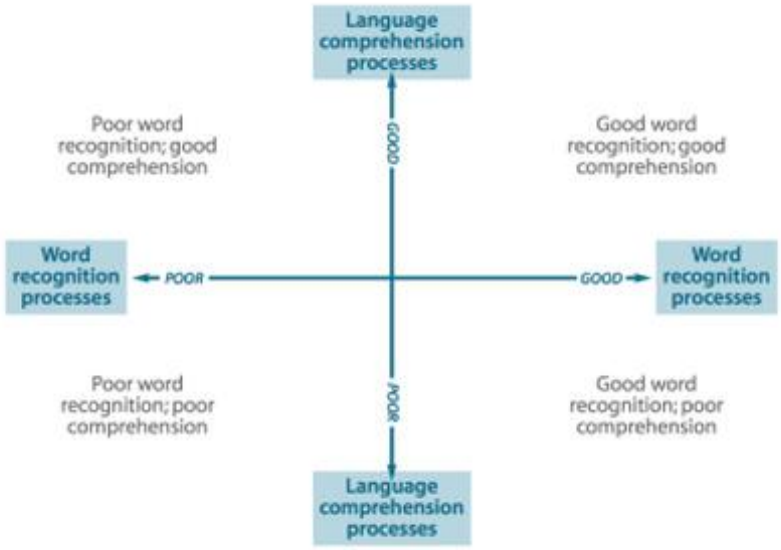

Figure 2.2 displays the Simple View of Reading. The image is adapted from Rose (2008).

Moats and Hennessy (2009) use the numbers one and zero to demonstrate the SVR formula. Figure 2.3 illustrates the examples of students fulfilling various aspects of a formula developed by Moats & Hennessy (2009). A student with zero D (decoding skills) and one LC (language comprehension), has zero RC (reading comprehension) because 1 x 0= 0. This student fits into the poor decoding; good language comprehension category. Similarly, a student with one D and zero LC also results in zero RC because again 1 x 0 = 0. This student fits into the good decoding; poor comprehension category. Finally, a student with one D and one LC has one RC (1 x 1=1) and fits into the good decoding; good comprehension category while a student with zero D and zero LC results in zero RC (0 x 0=0) and fits into the poor decoding; poor comprehension category. Students lacking either or both D and LC will have problems with overall reading comprehension while students with adequate D and LC will exhibit better reading comprehension (Moats & Hennessy, 2009; Kirby & Salvage, 2008; Catts & Weismer,

2006; Hoover & Gough, 1990). The goal of reading instruction within the SVR model is to promote decoding skills and language comprehension (Gough & Tumner, 1986; Hoover & Gough, 1990); therefore, word-study strategy instructional interventions are necessary for struggling readers to develop the requisite decoding skills that could lead to fluent reading and reading comprehension given that the readers have adequate language comprehension (Hougen, 2014; Edmonds et al., 2009; Boardman et al., 2008).

Figure 2.3. Example of the Simple View of Reading Formula and Rose Model

D x LC= RC

(D) Decoding	**(LC) Language Comprehension**	**(RC) Overall Reading Comprehension**	**Category**
0	1	0	Poor decoding/good language comprehension
1	0	0	Good decoding/poor language comprehension
0	0	0	Poor decoding/poor language comprehension
1	1	1	Good decoding/good language comprehension

Figure 2.3. displays an example of the Simple View of Reading formula with the Rose Model.

Scarborough's Rope Model. Scarborough's Rope Model (2001) provides an extended illustration of the SVR by proposing that skilled reading consists of many strands woven together to create a tight rope (Murray, 2016). The SVR is "simple" because it contains the two overarching categories, word recognition and language comprehension (Gough & Tumner, 1986;

Hoover & Gough, 1990) while the Rope Model is more complex because it divides language comprehension and word recognition into subparts (Scarborough, 2001). The language comprehension section of Scarborough's rope comprises background knowledge, vocabulary knowledge, language structures, verbal reasoning, and literacy knowledge while the word recognition section entails phonological awareness, decoding, and sight word recognition. Phonological awareness, decoding, and word recognition are described in the "Reading Process" section of this chapter. Once intertwined, these individual ropes create a tightly braided rope resulting in skilled reading composed of fluent word recognition and text comprehension.

Reading comprehension is the ultimate goal of teaching students to read; therefore, it is important for students to develop automaticity or automatic recognition of words (Alvermann, Unrau & Ruddell, 2013; Rosenthal & Ehri, 2011; Battacharya & Ehri, 2004). In order to teach students automatic word recognition, students need instruction in phonological awareness, decoding, and sight word recognition (Murray, 2016; Alverman et al., 2013; Moats, 2009b). In Scarborough's Rope Model (2001), language comprehension strategies become increasingly strategic while the word recognition strategies become increasingly automatic with time. Although struggling readers demonstrate deficits in some or all areas of word recognition or language comprehension (Vaughn et al., 2012; Boardman et al., 2008; Slavin et al., 2008; Archer et al., 2005), the ultimate goal of reading instruction through Scarborough's Rope Model (2001) is to produce skilled readers (Moats & Hennessy, 2009). Word-study strategy instructional interventions provide a tool for helping struggling readers increase word recognition skills and potentially lead to the ultimate goal of skilled reading (Hougen, 2014; Edmonds et al., 2009; Moats & Hennessy, 2009; Boardman et al., 2008).

Figure 2.4. Scarborough's Rope Model

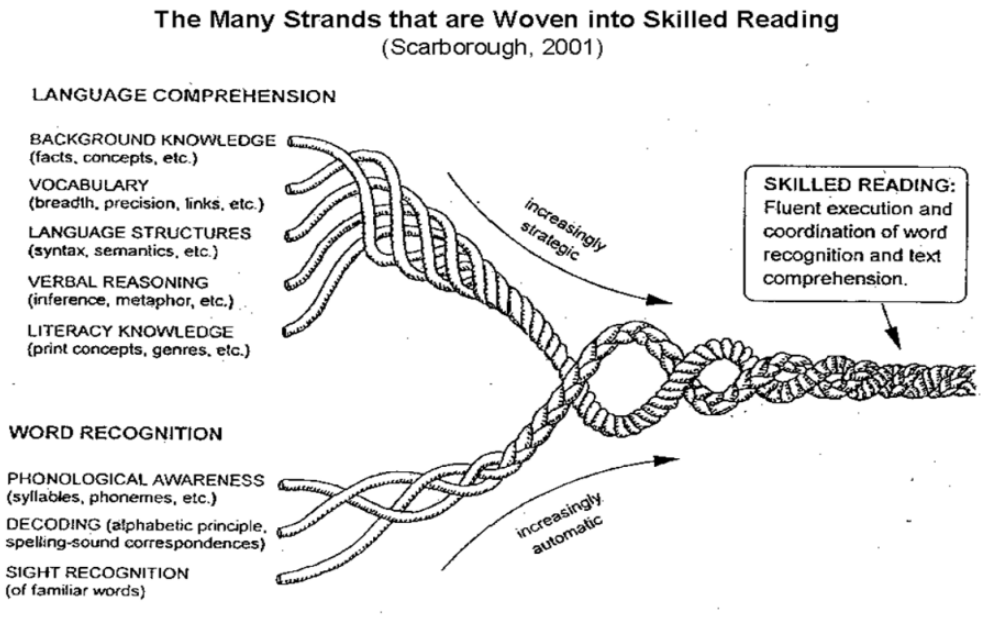

Figure 2.4. Scarborough's Rope Model reveals the many strands that are woven into skilled reading. Image originally printed in the *Handbook for Research in Early Literacy* (pp. 97-110). Scarborough, H. S. (2001). New York, NY: Guilford. Reprinted with permission.

Struggling Adolescent Readers

The current study relates to the SVR (Gough & Tunmer, 1986) and the Rope Model (Scarborough, 2001) because it investigates intervention strategies that could potentially improve struggling adolescent readers' abilities to decode multisyllabic words with the expectation that when readers can decode multisyllabic words, their fluency and comprehension skills will improve. Since word recognition is a necessary component for skilled reading according to both the SVR (Gough & Tumner, 1986) and the Rope Model (Scarborough, 2001), this current study seeks to increase proficiency in fluency and comprehension by providing struggling adolescent readers with overt/covert (Archer et al., 2005) and outside-in (Ebbers, 2011) word-study

intervention strategies. The intent of providing participants in this current study with word-study strategy instructional interventions is to strengthen their word recognition skills and possibly impact their fluency and comprehension scores.

Adolescents, such as the participants in this current study, are youth occupying the unique space between childhood and full adulthood (Christenbury et al., 2009). Struggling adolescent readers belong to both a strategic and intensive groups of learners and often display significant gaps in their decoding abilities, reading fluency, vocabulary knowledge, and overall reading comprehension (Honig et al., 2013; Vaughn & Fletcher, 2012; Lovett et al., 2011; Slavin et al., 2008). Strategic learners are below grade level but are able to make progress with targeted assistance while intensive learners are significantly below grade level and require extensive concentrated interventions (Honig et al., 2013). The participants in the current study are intensive learners.

Since learning to read words is necessary to understand text, older struggling readers need intensive word study interventions to decode regular words, identify irregular words, and use word parts to read multisyllabic words (Honig et al., 2013; Tolman & Moats, 2014). Some students need interventions in phonics while other students require word-study interventions that focus on decoding multisyllabic words (Hougen, 2014; Honig et al., 2013; Vaughn et al., 2010; Archer et al., 2005). Instruction for older struggling readers should include phonemic awareness, sound/spelling correspondences, and decoding (Hougen, 2014; Honig et al., 2013; Moats, 2009b). Since older students must read multisyllabic words, instruction should go beyond phonics to advanced morphological and orthographic knowledge (Ehri, 2014). Over thirty years ago, researchers found little justification for teaching syllabication rules to improve reading comprehension (Cunningham, Cunningham, & Richard, 1981; Maranzo, Cae, Debooy, &

Prochoruck, 1976; Canney & Schreiner, 1976). However, more current research acknowledges that knowledge of the six syllable types and pronunciation of sounds is useful in recognizing unfamiliar words (Tolman & Moats, 2014; Tunmer & Chapman, 2012). Instead of teaching syllabication rules, interventionists may focus on teaching word-study strategies (Hougen, 2014; Archer et al., 2005; Gustafon & Klum, 1977) by developing routines for decoding unfamiliar words, dividing the words into syllables, saying the words audibly, and discussing the meaning of the words to promote student retention of the words (Archer & Hughes, 2011). Archer et al. (2005) and Ebbers (2011) provide word-study strategies designed to help struggling readers decode multisyllabic words.

Struggling adolescent readers often demonstrate problems in one or more components of reading (Honig et al., 2013; Moats & Tolman, 2009; Boardman et al., 2008; Torgesen et al., 2007). Since decoding, fluency, vocabulary and comprehension shift in depth and complexity as students advance from elementary school to middle and high school, the Carnegie Council on Advancing Adolescent Literacy (2010) recommends instruction in attacking multisyllabic words, repeated readings to increase fluency, focus on morphemic analysis to enhance decoding skills and develop vocabulary, and explicit instruction in comprehending complex texts. The Carnegie Council on Advancing Adolescent Literacy (2010) also recommends assigning struggling readers to appropriate interventions and monitoring students' progress. While researchers agree that effective instructional strategies in word-study are essential for enhancing struggling readers' decoding skills (Solis et al., 2014; Lovett et al., 2011; Boardman et al., 2008; Scammacca et al., 2007; Denton et al., 2007; Nagy et al., 2006; Bhattacharya & Ehri, 2004), the body of research surrounding struggling adolescent readers (Scammacca et al., 2015; Solis et al., 2014; Wanzek et al., 2013;Vaughn et al., 2012; Lovett et al., 2011; Boardman et al., 2008; Torgesen et al., 2007)

demonstrates a need for more information regarding the impact of word-study interventions on struggling readers' fluency and comprehension measures.

Effective Intervention Strategies

Researchers (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2012; Lovet et al., 2011; Edmonds et al., 2009; Kamil et al., 2008; Slavin et al., 2008) agree word-study strategies, fluency, comprehension strategies, computer-based intervention programs, and motivational components are necessary for effective intervention programs. However, a major gap in the literature is an inconclusive solution for the most effective combination of interventions to impact reading development (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2012; Lovett et al., 2011; Edmonds et al., 2009; Slavin et al., 2008). As demonstrated in Figure 2.6, this current study investigates struggling readers' use of two word-study strategies within an intervention bundle consisting of fluency, comprehension strategies, a computer-based intervention program, and a motivational component. The word-study instructional intervention strategies fit intricately into the word recognition category of the SVR (Gough & Tumner, 1986) and Rope Model (Scarborough, 2001) because the strategies are useful for decoding multisyllabic words (Ebbers, 2011; Archer et al., 2005).

Figure 2.5. Components of Effective Intervention Programs

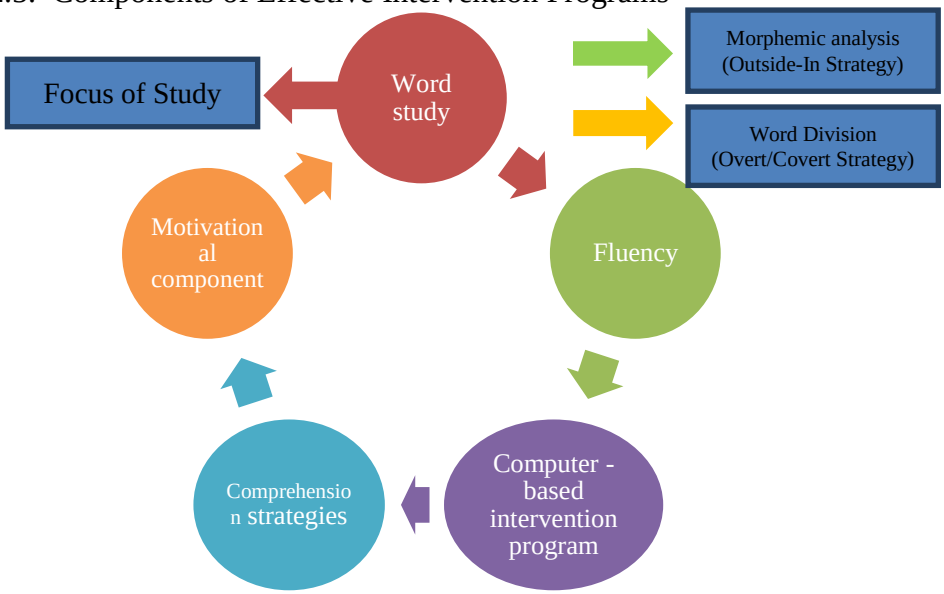

Figure 2.5 displays essential components in an effective intervention program.

Word Study. Approximately one-third of adolescent struggling readers exhibits word recognition problems and struggles to comprehend text (Scammacca et al., 2015; Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011; Vaughn et al., 2010). The ability to decode words effectively is necessary for reading fluency and comprehension (Wharton-McDonald & Swiger, 2009; Boardman et al., 2008; Solis et al., 2007; Nagy et al., 2006). In addition, the SVR (Gough & Tumner, 1986) and the Rope Model (Scarborough, 2001) demonstrate the importance of word recognition skills in relation to the development of overall reading comprehension abilities. Word-study interventions involving morphology and word division strategies are recommended because word-study interventions involving morphology have significant positive effects on student reading achievement (Graves, 2011; Moats, 2009a; Ebbers & Denton, 2008), and word-study strategies requiring readers to divide words into parts aid readers in decoding multisyllabic words (Hougen, 2014; Honig et al., 2013; Archer et al., 2005).

Multisyllabic word reading. The ability to read multisyllabic words becomes more crucial for readers as text complexity increases (Honig et al., 2013; Moats & Tolman, 2009; Christenbury et al., 2009; Diliberto et al., 2009). Sometimes students who are able to read single syllable words have trouble reading multisyllabic words (Tolman & Moats, 2014). Phonics teaches students to read single syllable words while explicit instruction in recognizing syllables and morphemes provides students with strategies to read longer words (Hougen, 2014; Honig et al., 2013; Ebbers, 2011; Ebbers & Denton, 2008). According to Nagy and Anderson (1984), the words that students encounter in fifth grade and beyond contain seven or more letters and two or more syllables. The brain must learn to decode common letter patterns in recurring word parts to read words in text fluently and accurately. These word parts may be chunks of syllables, affixes, or phonograms (Glaser & Moats, 2008). Skilled readers automatically break words into smaller units based on common letter patterns found in the brain's memory (Moats, 2009b). Adolescent struggling readers have problems with decoding words accurately due to the lack of strategies for decoding multisyllabic words (Archer et al., 2005). Current research (Hougen, 2014; Honig et al., 2013; Ebbers, 2011; Boardman et al., 2008; Archer et al., 2005) suggests students learn word division strategies (i.e. overt/covert strategies) and morpheme analysis techniques (i.e. outside-in strategy) to aid in decoding multisyllabic words.

Word division strategies. Word division strategies help students break multisyllabic words into syllabic parts (Honig et al., 2013; Archer et al., 2005; Archer et al., 2003) Various researchers (Hougen, 2014; Honig et al., 2013; Boardman et al., 2008; Archer et al., 2005) recommend teaching multisyllabic words by using division principles, recognizing syllable types, and using adaptable syllabication strategies. Through the introduction of syllable types, students are exposed to the vowels in the six types of syllables found within English words

(Glaser & Moats, 2008; Moats, 2005). This is beneficial because students first practice syllable types in single syllable words before progressing to multisyllabic words. Since open and closed syllables make up 75 percent of syllables in English words, they are considered essential for polysyllabic decoding (Honig et al., 2013). Familiarity with syllable division enhances students' abilities to read longer words (Archer et al., 2005; Archer et. al, 2003), and overt/covert word division strategies are highly recommended instructional tools for teaching readers to decode multisyllabic words (Archer et al., 2005).

Overt/covert strategies. Overt/covert strategies (Mullaney et al., 2014; Kundert et al., 2013; Graves et al., 2011; Vaughn et al., 2010; Archer et al., 2005; Shippen et al., 2005) provide an explicit process for decoding multisyllabic words. Overt strategies require readers to divide words into syllables, circle prefixes and suffixes, underline the vowels, say the parts of the word, say the whole word, and make it a real word, and covert strategies encourage readers to look for prefixes, suffixes, and vowels, say the parts of the word, say the whole word, and make it a real word.

Several studies have analyzed the effects of the covert/overt word division strategies. Mullaney et al. (2014) Kundert et al. (2013), Graves et al. (2011), Vaughn et al. (2010), and Shippen et al. (2005) reported significant gains in the decoding abilities of students using covert/overt word-study strategies and suggested further research to support the effectiveness of the covert/overt word attack methods for impacting students' reading fluency and comprehension.

Morphemic analysis. In addition to overt/covert word division strategies, struggling readers benefit from morphemic analysis word-study interventions. Morphology involves the study of the smallest units of meaning in the English language, morphemes consisting of roots,

prefixes, and suffixes (Hougen, 2014). Morphemic analysis requires students to decode words by looking inside words for various word parts (roots, prefixes, and suffixes) (Ebbers, 2011; Ebbers & Denton, 2008). Readers with the ability to analyze morphemes by dividing words into morphemic patterns (prefixes, suffixes, and roots) considerably enlarge their vocabularies and their abilities to use context clues to aid comprehension because readers are able to break multisyllabic words into meaningful parts (Palumbo et al., 2015; Ebbers & Denton, 2008; Baumann, Ware, & Edwards, 2007; Nagy et al., 2006). Students improve decoding abilities and expand their vocabularies substantially when they receive explicit instruction in morphemic analysis and learn the meanings of the most common prefixes and suffixes instead of memorizing lists of unrelated words (Palumbo et al., 2015; Gutlohn & Besselieu, 2014; Pacheco & Goodwin, 2013). Because struggling readers often shy away from multisyllabic words due to their inabilities to decode lengthy words, morphemic analysis instruction provides readers with clues to pronounce and determine the meanings of multisyllabic words (Palumbo et al., 2015; Knight-McKenna, 2008); therefore, educators may enhance word-study instruction and improve readers' retention of new words by promoting morphemic analysis (Hougen, 2014; Pacheco & Goodwin, 2013). The outside-in strategy is an instructional tool that educators may utilize to teach struggling readers the concept of morphemic analysis.

Outside-in strategy. Various researchers recognize the benefits of teaching struggling readers morphemic analysis strategies (Wolter & Gibson, 2015; Wolter & Green, 2013; Kirk & Gillon, 2009; Deacon & Kirby 2004). The outside-in strategy developed by Ebbers (2011) is an example of a strategy that uses context and morphological clues to infer word meanings. Readers carry out the following steps with the outside-in strategy:

1. Look outside the word at context clues in neighboring words and sentences.
2. Look inside the word at the word parts (i.e., prefix, root, and suffix).
3. Re-read the entire context, keeping the meaningful word parts in mind.
4. Make an inference about the meaning of the word. Does it make sense in the context of the passage?

Morphemic analysis differs from the overt/covert strategy by teaching students to derive meaning from parts of words. Because researchers agree word-study strategies are necessary for effective intervention programs (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn et al., 2012; Lovett et al., 2011), it is rational to analyze the impact of the overt/covert and outside-in word study instructional intervention strategies on struggling adolescent readers' fluency and comprehension measures.

Relevance of Literature to Current Study

Various researchers propose a need for future research on reading interventions to confirm and extend existing knowledge of effective interventions, (Scammacca et al., 2015; Solis et al., 2014; Wanzek et al., 2013). In addition, Vaughn et al. (2012) and Lovett et al. (2011) suggest further investigation of adolescent interventions. To address this gap, the current study adds to the existing literature surrounding reading interventions by investigating the effectiveness of word-study interventions implemented through a bundled approach. This current

study differs from previous research by specifically investigating the impact of the overt/covert and outside-in word-study strategies on students' fluency and comprehension measures.

Summary

The following figure provides a comprehensive summary of this chapter.

Figure 2.6. Summary

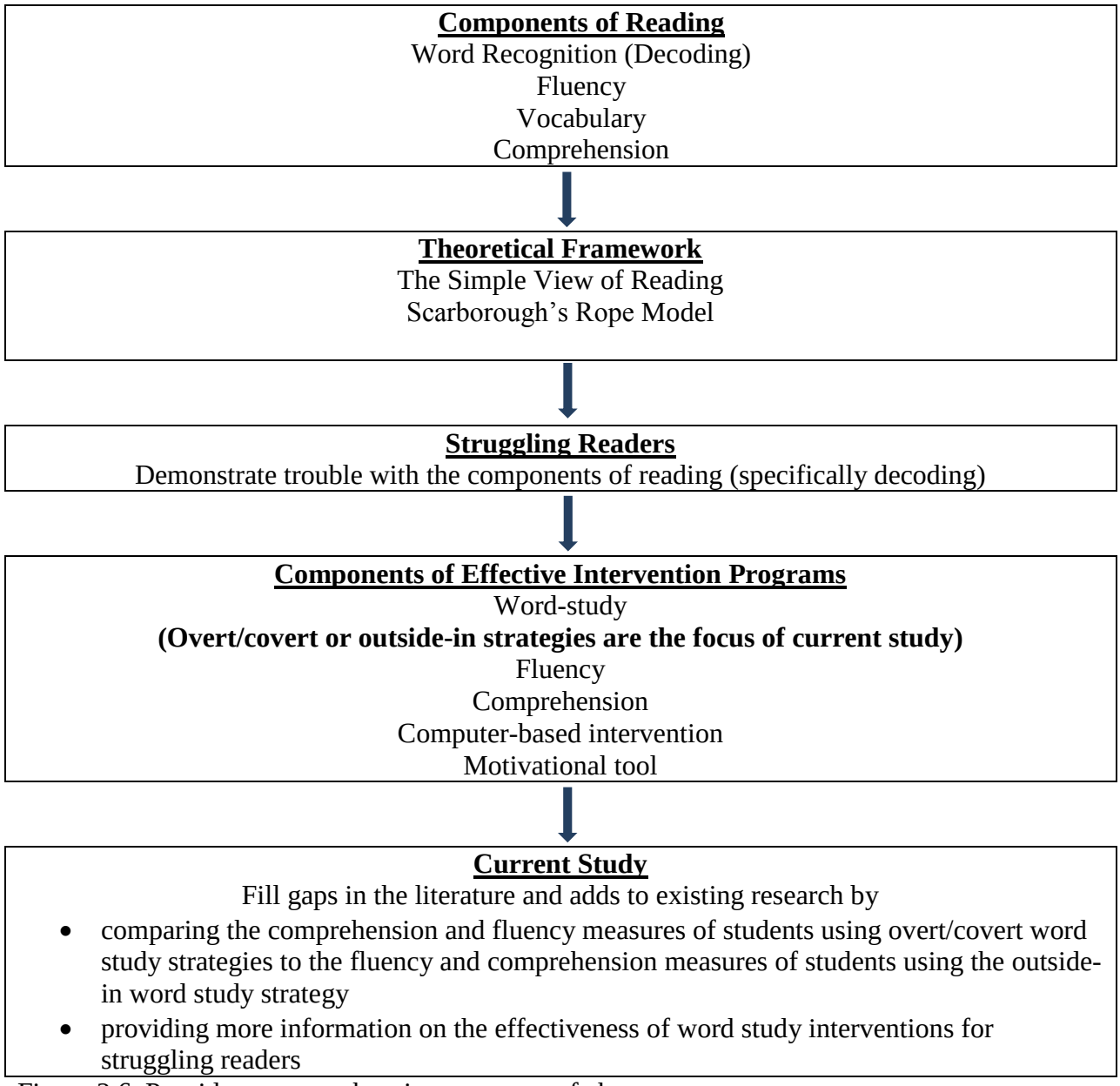

Figure 2.6. Provides a comprehensive summary of chapter two.

Figure 2.6 provides a comprehensive summary of chapter two. The process of reading consists of decoding, fluency, vocabulary, and comprehension (Honig et al., 2013; Boardman et al., 2008; Glaser & Moats, 2008; Moats, 2009a; NRP, 2000). Decoding is a foundational component in the reading process because reading fluency and comprehension are dependent upon the reader's ability to decode and recognize words in texts (Hougen, 2014; Boardman et al., 2008; National Reading Panel, 2000; Hoover & Gough, 1990). Many struggling readers require word-study instructional interventions to aid them in decoding multisyllabic words in complex texts (Scammacca et al., 2015; Hougen, 2014; Moats, 2009; Boardman et al., 2008). The SVR (Gough & Tumner, 1986) and the Rope Model (Scarborough, 2001) form the theoretical basis for this current study because both models demonstrate the necessity of adequate word recognition skills to develop reading fluency and comprehension. Researchers agree that effective intervention programs include a combination of word-study, fluency, comprehension, computer-based instruction, and motivational tools to address the reading deficiencies of struggling readers (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2012; Lovett et al., 2011; Boardman et. al., 2008; Slavin et al., 2008). The study focuses on two different word-study instructional interventions that participants received. This current investigation seeks to fill gaps in the literature and add to existing research by comparing the comprehension and fluency measures of students using overt/covert word-study strategies (Archer et al., 2005) to the fluency and comprehension measures of students using the outside-in word-study strategy (Ebbers, 2011). The ultimate goal is to continue existing research on effective word-study interventions for struggling adolescent readers and discover solutions that provide students with tools to become proficient readers.

CHAPTER 3

Methodology of the Study

A Description of the General Methodology

This study incorporated an experimental research method (Creswell, 2013) based on Gough and Tumner's (1986) SVR theory and Scarborough's (2001) Rope Model. The researcher collected data based on tier three struggling readers who received overt/covert or outside-in word-study interventions. Researchers (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2012; Lovett et al., 2011; Slavin et al., 2008) recommend the combination of word study, fluency, comprehension, computer-based, and motivational components to help students develop reading proficiency. This current study included all of the recommended components but sought to determine how the two different word-study strategies (overt/covert or outside-in) impacted students' fluency and comprehension scores.

Rationale for using Experimental Method Strategy

According to Creswell (2013), the experimental research method investigates whether a specific treatment influences an outcome. Experimental research generally administers an independent variable to one or more treatment groups and withholds the independent variable from the control group to determine if outcomes vary between the treatment and control groups. However, there are instances when the independent variables are administered to more than one

treatment group and results from the treatment groups are analyzed to determine if differences between the outcomes of both treatment groups occur (Kline, 2005).

According to Dimitrov and Rumrill (2003), randomized pretest-posttest designs in which participants are randomly assigned to treatment groups, administered a pretest before treatment, and assigned a posttest after treatment, control well for threats to internal reliability (maturation and history) or external reliability (interaction between pretesting and treatment). Pretest-posttest designs are generally used in educational settings to compare groups or evaluate change resulting from experimental treatment (Schneider, Carnoy, Kilpatrick, Schmidt, Shavelson, 2007; Dimitrov & Rumrill, 2003).

In this current study, students were randomly assigned to the overt/covert or outside-in intervention group. One group received overt/covert and one group received outside-in word-study instructional interventions. The fluency and comprehension scores of students in both groups were analyzed to determine if differences in pretest and posttest scores existed. Data was also analyzed to determine if differences in the growth of students' fluency and comprehension scores occurred.

The Research Context or Site

The research site was a rural high school in North Mississippi. The high school campus consisted of two buildings and housed approximately 484 students in grades 7-12. Those 484 students consisted of 87 seventh graders, 76 eighth graders, 84 ninth graders, 88 tenth graders, 78 eleventh graders, and 71 twelfth graders. Of those students, 128 were Caucasian males, 128 were Caucasian females, 117 were African American males, 101 were African American females, three were Hispanic males, three were Hispanic females, and four were Asian females. Seventy-four percent of the student population qualified for free or reduced lunch. All students attended

seven 52-minute class periods daily. Seventh and eighth grade students were enrolled in the following classes: language arts, math, science, social studies, intervention/study skills, information and computer technology (ICT), and physical education.

Participants

The participants in this study were seventh and eighth grade students reading two or more grades below their current grade level. The seventh grade student population consisted of 87 students including 24 Caucasian males, 22 Caucasian females, 25 African American males, and 15 African American females. Of the 87 seventh grade students, 30 participated in the study. The eighth grade student population consisted of 76 students including 17 Caucasian males, 27 Caucasian females, 15 African American males, and 16 African American females. Of the 76 eighth grade students, 17 participated in the study. Table 1 displays the participants by grade level, gender, and race/ethnicity.

Table 1

Participants

Grade	African American Males	African American Females	Caucasian Males	Caucasian Females	Total
7th Grade	12	7	6	5	30
8th Grade	5	8	3	1	17
Total	17	15	9	6	47

Instruments

Oral reading fluency instrument. *Easy Curriculum Based Measurements (easyCBM)* includes an oral reading fluency (ORF) assessment to determine the number of words students read correctly in one minute. In ORF assessment, the teacher/interventionist listens for one minute to the student read aloud an unpracticed grade-level passage. As the student reads aloud, the teacher/interventionist marks decoding errors the student makes on a copy of the passage. At the end of one minute, the teacher calculates the student's ORF by subtracting the number of errors from the total number of words read. ORF scores are expressed as words correct per minute (WCPM). For example, if a student reads 90 words in one minute and makes eight errors, the student has an ORF of 82 WCPM (Honig et al., 2013).

The *easyCBM* ORF assessment requires that students read three different passages to calculate the WCPM. The median WCPM of the three passages is recorded because the median is similar to the mean in representing the central tendency of the three scores (Daniel, 2010). According to Daniel (2010), use of the median score is more reliable than a single score because the median score covers a broader range than a single score.

Anderson et al. (2014) report inter-rater reliabilities and test-retest reliabilities for *easyCBM* ranging from 0.88-0.94. Criterion validity, the likelihood of a student to score similarly on another assessment, ranges from 0.75-0.90 (Anderson et al., 2014).

Comprehension instrument. *Renaissance STAR Reader* is a predictive assessment program of students' reading comprehension levels (*STAR*, 2014). Over 400 studies support the reliability and validity of *Renaissance STAR Reader* with average correlations ranging from 0.60-0.87 (*STAR*, 2014), and the National Center on Intensive Intervention and The National

Center on Response to Intervention highly rate *Renaissance STAR Reader* as a screening and progress-monitoring tool (RTI, 2016).

Renaissance STAR Reader assesses comprehension through short comprehension items and extended comprehension items. Items are based on the notion that vocabulary is tied to comprehension (Davis, 1942; Just & Carpenter, 1987 as cited in *Renaissance Learning*, 2011). Short comprehension items supply a single contextual sentence with a single word deletion while longer items include multiple contextual sentences with a single word deletion. The semantics and syntax of the text provide clues for students to choose the correct answer choice. Although all of the answer choices fit the context sentence semantically or syntactically, only one answer is correct. The test items require comprehension because students must understand the meaning of the sentence or passage to choose the correct answer (*STAR*, 2014).

Renaissance STAR Reader assessment has an item bank size of 5,000 or more multiple choice items with 34 questions appearing on each test. The *Renaissance STAR Reader* assessment uses adaptive technology to generate questions that vary in complexity and difficulty and are adaptive based upon student responses to previous questions. For example, as students answer questions correctly, the difficulty level increases. As students answer questions incorrectly, the difficulty level decreases.

Renaissance STAR Reader generates grade equivalent levels (GE), instructional reading levels (IRL), and scale scores (SS) for students based on students' responses to questions. The GE score is norm referenced and reveals how a student's scores compare with other students' scores nationally. For example, a student with a 5.2 GE performed as well as a typical fifth grade student during the second month of the fifth grade year. The IRL is criterion referenced and reveals the highest level a student can score as 80% or higher at comprehending text with

assistance. A student with a 6.0 IRL can score 80% or higher at comprehending a sixth grade level text with assistance. According to *STAR* (2014), the scale score (SS) is useful when comparing student performance over time. Because the same range is used for all students, student performance may be compared across grade levels as well. *STAR Reading* scaled scores range from 0-1400. Any increase in scale score indicates student growth. Because the scale score was the dependent variable in this study, the researcher analyzed the students' scale scores to determine if any change occurred in students' initial and final reading comprehension scaled scores.

Materials for Intervention

Overt/Covert intervention materials. *REWARDS,* a program designed by Archer et al. (2005), uses overt strategies which shows students how to divide words into syllables circling prefixes and suffixes, underlining the vowels, saying the parts of the word, saying the whole word, and making it a real word. It also uses covert strategies encouraging readers to look for prefixes, suffixes, and vowels, say the parts of the word, say the whole word, and make it a real word. *REWARDS* program consists of 20 comprehensive teacher-directed lessons containing instructional activity procedures and lesson blueprints which provide teacher wording and student responses. Lessons 1-12 are pre-skill lessons while lessons 13-20 are strategy lessons. The daily activities are similar and contain two scripted lesson plans for the instructor to follow. *REWARDS* program also includes strategies for reading long words, student prefixes, suffixes, and vowel combinations chart, optional vocabulary activities, and a word list. Figure 3.1 outlines the steps in the *REWARDS* program.

Figure 3.1 Strategies for Reading Long Words

Overt Strategy

1. Circle the prefixes.
2. Circle the suffixes
3. Underline the vowels.
4. Say the parts of the word
5. Say the whole word.
6. Make it a real word.

Covert Strategy

1. Look for prefixes, suffixes, and vowels.
2. Say the parts of the word.
3. Say the whole word.
4. Make it a real word.

Figure 3.1. Strategies for reading long words. Information is adapted from Archer et al. (2005).

Outside-in intervention materials. *Vocabulary through Morphemes* developed by Ebbers (2011) utilizes the outside-in strategy. The outside-in strategy emphasizes context and morphological clues to infer word meanings. Readers carry out the following steps with the outside-in strategy:

1. Look outside the word at context clues in neighboring words and sentences.
2. Look inside the word at the word parts (i.e., prefix, root, and suffix).
3. Re-read the entire context, keeping the meaningful word parts in mind.
4. Make an inference about the meaning of the word. Does it make sense in the context of the passage?

The *Vocabulary through Morphemes* workbooks consist of daily teacher-directed, scripted lessons teaching students Greek and Latin roots, prefixes, suffixes, and the application of the outside-in strategy. In a typical lesson, students learn to break words into parts based on the morphemes (prefixes, suffixes, and roots) and create different forms of base words by adding prefixes or suffixes to the base words. Students learn that suffixes influence syntax and are introduced to morphological families of words. Students apply steps one through four of the outside-in strategy to words in each lesson.

Research Questions

1. What is the impact of the use of overt/covert word-study strategies on struggling adolescent readers' fluency scores?
2. What is the impact of the use of overt/covert word-study strategies on struggling adolescent readers' comprehension scores?
3. What is the impact of the use of outside-in word-study strategies on struggling adolescent readers' fluency scores?

4. What is the impact of the use of outside-in word-study strategies on struggling adolescent readers' comprehension scores?
5. Is there a significant difference between the fluency scores of students who receive overt/covert word-study interventions compared to students who receive outside-in word study interventions?
6. Is there a significant difference in the comprehension scores of students who receive overt/covert word-study interventions compared to students who receive outside-in word-study interventions?

Null Hypotheses

1. The use of overt/covert word-study strategies has no impact on struggling adolescent readers' fluency scores.
2. The use of overt/covert word-study strategies has no impact on struggling adolescent readers' comprehension scores.
3. The use of outside-in word-study strategies has no impact on struggling adolescent readers' fluency scores.
4. The use of outside-in word-study strategies has no impact on struggling adolescent readers' comprehension scores.
5. There is no difference in fluency scores of students receiving overt/covert word-study interventions compared to students receiving outside-in word study interventions.
6. There is no difference in the comprehension scores of students receiving overt/covert word study strategies compared to students receiving outside-in word-study interventions.

Procedures

Within the Response to Intervention (RtI)/ Multi-Tiered System of Supports (MTSS) model required by the Mississippi Department of Education (MDE), tier three students were identified by an *i-Ready Diagnostic* (Curriculum and Associates, 2016) universal screener, previous academic history, and teacher recommendations. Parents were notified of their students' tier statuses via letter and were invited to conferences with the Teacher Support Team (TST) to discuss the tier process and interventions their children received.

During the nine-week intervention period, school administrators performed integrity checks to ensure that the interventions were appropriate for the needs of the students, the interventions were delivered in a manner consistent with the details described below, the students' attendance was not a significant factor in hindering their progress, and the students' parents/guardians received notification of the intervention plan.

The interventionist provided word-study interventions for tier three students using procedures similar to Shippen et al., (2005), Graves (2011), and Kundert et al. (2012). Tier three students were randomly assigned to the overt/covert word study intervention group or the outside-in word study intervention group. To place into intervention groups, students' identification numbers, reading levels, and gender were displayed on a spreadsheet. The students were stratified by reading level (grades three-five) and then every other one was assigned to each category, ensuring that an equal number of students were in each intervention group. Starting with the identification numbers at the top of the sheet, the interventionist placed the students in one of two groups using the number "one" for the overt/covert strategy and the number "two" for the outside-in strategy.

Students were assessed prior to the intervention utilizing *Renaissance STAR Reader* assessment to determine their initial reading comprehension scores as measured using a scale score and the *easyCBM* fluency assessment to determine their initial fluency scores as measured by WCPM. Students received nine weeks of overt/covert or outside-in word study interventions. See the "Materials for Intervention" section of this chapter for details regarding overt/covert or outside-in word study instruction. To follow current researchers' (Scammacca et al., 2015; Solis et al., 2014; Wanzek et al., 2013;Vaughn et al., 2012; Lovett et al., 2011) recommendations, students also received repeated reading fluency instruction, six basic comprehension strategies instruction (monitor comprehension, connect to world knowledge, predict, construct mental images, ask questions, and summarize), computer-based interventions through *i-Ready* reading lessons, motivation through *Accelerated Reader*, and regular language arts instruction based on the *Mississippi College and Career Readiness Standards*. The only difference within the intervention instructional framework was the type of word study instruction implemented with *REWARDS* (overt/covert strategy) and *Vocabulary through Morphemes* (outside-in strategy). At the end of nine weeks, students took the *Renaissance STAR Reader* assessment to determine their reading comprehension scale scores and the *easyCBM* fluency assessment to determine their fluency scores.

Data Analysis

To analyze the data collected, paired sample *t*-tests were utilized to compare pre- and post-assessment results and test hypotheses 1-4. An Analysis of Covariance (ANCOVA) was used to test hypotheses 5-6 including the pretest scores as covariates.

1. What is the relationship between the use of overt/covert word-study strategies and struggling adolescent readers' fluency scores?
2. What is the relationship between the use of overt/covert word-study strategies and struggling adolescent readers' comprehension scores?
3. What is the relationship between the use of outside-in word-study strategies and struggling adolescent readers' fluency scores?
4. What is the relationship between the use of outside-in word-study strategies and struggling adolescent readers' comprehension scores?
5. Is there a significant difference in the fluency scores of students who receive overt/covert compared to students who receive outside-in word-study interventions?
6. Is there a significant difference in the comprehension scores of students who receive overt/covert compared to students who receive outside-in word-study interventions?

Paired sample *t*-tests are utilized when comparing before and after conditions (i.e. pre- and post-assessment scores) on the same subjects, and ANCOVAs include one or more continuous variables that might influence the outcome (Hinkle, Wiersma, & Stephen, 2003). Kline (2005) suggests using an ANCOVA when the covariate is the pretest score and the dependent variable is the posttest score. In this study, the covariate was the fluency and comprehension pretest scores and the dependent variable was the fluency and comprehension posttest scores. The independent variable was the type of word-study strategy (overt/covert or

outside-in) implemented. The consort diagram in Figure 3.2 displays the flow of participants through each stage of the randomized trial.

Figure 3.2. Consort diagram

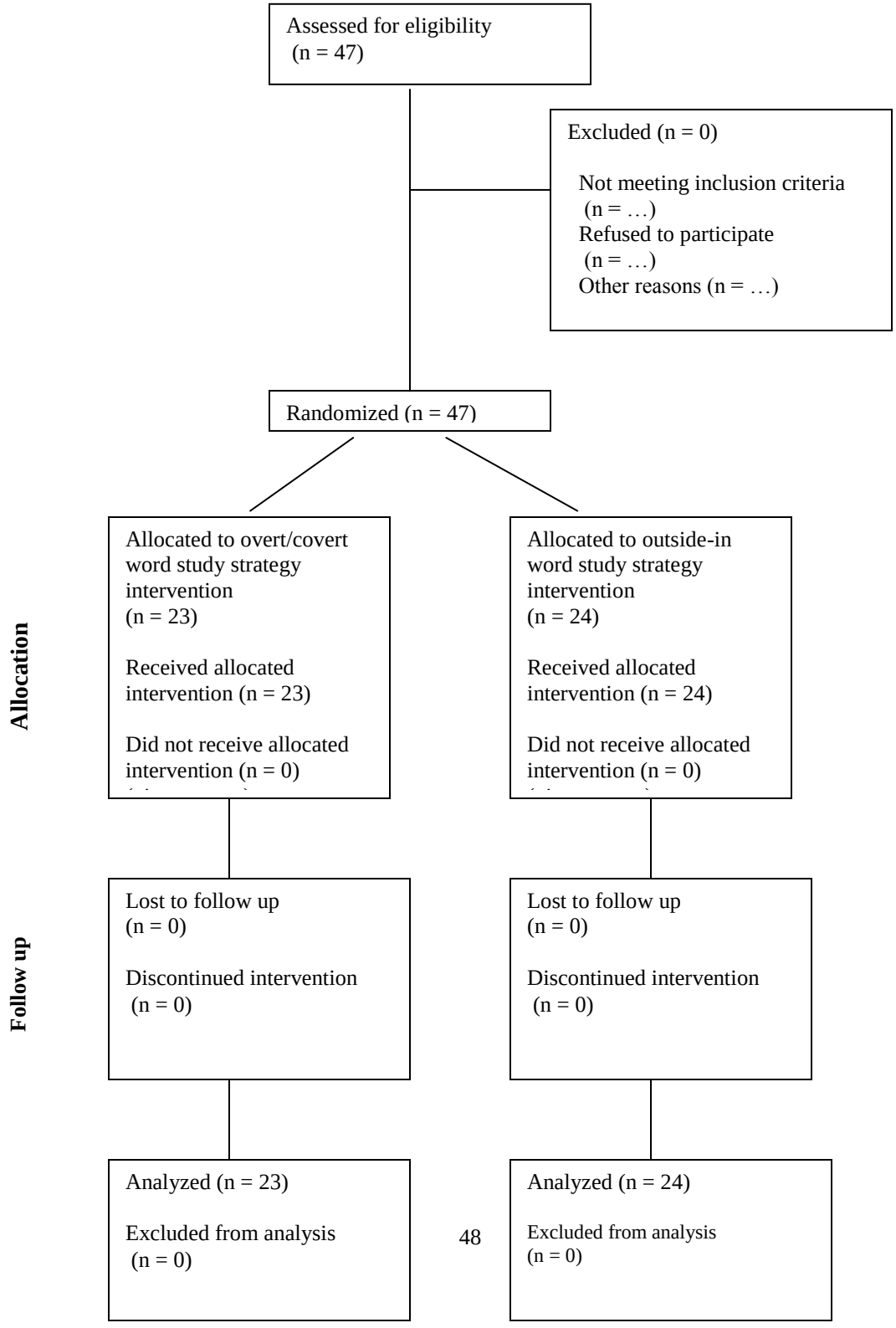

Figure 3.2. Consort diagram shows the flow of participants through each stage of the randomized trial.

Reporting and Interpretation of Results

The results are presented in a data table and thoroughly explained in the results and discussion sections. The final interpretation includes evidence from the data to answer to the research questions. The data analysis reveals how word-study strategy intervention instruction in combination with fluency, comprehension, computer-based, and motivational instructional components impact students' fluency and comprehension scores. The data analysis also explains whether both word-study strategies are equally effective or ineffective or if one strategy is more effective than the other strategy. For example, if the data analysis revealed that either or both word-study interventions had a positive effect on students' fluency and comprehension scores, one might infer that either or both intervention combinations are effective for struggling readers. On the other hand, if the data revealed either or both word study instructional strategies had no effect or a negative impact on students' fluency and comprehension scores, one might infer that either or both intervention combinations are ineffective for this group of struggling readers and possibly suggest further research on the issue.

CHAPTER 4

Results

Introduction

The purpose of this experimental study was to determine the impact of struggling adolescent readers' use of two word-study intervention strategies (overt/covert or outside-in) on their fluency and comprehension scores. Participants were randomly assigned to the overt/covert or outside-in word study intervention group. As displayed in table 4.1, nine African American males, eight African American females, four Caucasian males, and three Caucasian females were assigned to the outside-in group while eight African American males, seven African American females, five Caucasian males, and three Caucasian females were assigned to the overt/covert group. After having their initial fluency and comprehension measures assessed using *easyCBM* for fluency and *Renaissance STAR Reader* for comprehension, participants received nine weeks of overt/covert or outside-in word study interventions. Participants' fluency and comprehension measures were assessed at the end of the nine week intervention period, and paired *t*-tests and ANCOVA statistical analyses were conducted to test the following hypotheses:

1. The use of overt/covert word-study strategies has no impact on struggling adolescent readers' fluency scores.
2. The use of overt/covert word-study strategies has no impact on struggling adolescent readers' comprehension scores.
3. The use of outside-in word-study strategies has no impact on struggling adolescent readers' fluency scores.

4. The use of outside-in word-study strategies has no impact on struggling adolescent readers' comprehension scores.
5. There is no difference in fluency scores of students receiving overt/covert word-study interventions compared to students receiving outside-in word study interventions.
6. There is no difference in the comprehension scores of students receiving overt/covert word-study strategies compared to students receiving outside-in word-study interventions.

Table 2

Participants' Demographics

Group	African American Males	African American Females	Caucasian Males	Caucasian Females	Total
Overt/covert	8	7	5	3	23
Outside-in	9	8	4	3	24
Total	17	15	9	6	47

Table 4.2 summarizes the paired samples statistics for students' fluency and comprehension scores in the overt/covert or outside-in word-study intervention groups while the following section provides a detailed explanation of the results.

Table 3

Summary of Paired Samples Statistics

Group	Test	N	Mean	Std. Deviation
Overt/Covert	Fluency Pretest	23	124.8	41.8
Overt/Covert	Fluency Posttest	23	154.1	35.1
Overt/Covert	Comprehension Pretest	23	514.9	98.3
Overt/Covert	Comprehension Posttest	23	517.4	98.5
Outside-in	Fluency Pretest	24	140.5	97.8
Outside-in	Fluency Posttest	24	159.6	26.9
Outside-in	Comprehension Pretest	24	513.9	104.3
Outside-in	Comprehension Posttest	24	531.5	140.4

Hypothesis 1 Results

The researcher hypothesized the use of overt/covert word-study strategies had no impact on struggling adolescent readers' fluency scores. A paired samples *t*-test was conducted to compare the pretest and posttest fluency scores of students using overt/covert word-study intervention strategies. There was a significant difference in the pretest scores (M= 124.8, SD=41.8) and posttest scores (M=154.1, SD=35.1) for fluency t (22) = -4.5, p= .00. The researcher rejected the

null hypothesis. The results suggested that students' fluency could increase significantly during a nine-week period when using overt/covert word-study strategies within an intervention bundle consisting of word study, fluency, comprehension, computer -based, and motivational components.

Hypothesis 2 Results

The researcher hypothesized the use of overt/covert word-study strategies had no impact on struggling adolescent readers' comprehension scores. A paired samples *t*-test was conducted to compare the pretest and posttest comprehension scores of students using overt/covert word-study strategies. There was no significant difference in the pretest scores (M= 514.9, SD=98.3) and posttest scores (M=517.4, SD=98.5) for comprehension t (22) =-4.2, p= .82. The researcher accepted the null hypothesis. The results suggested that students' comprehension is unlikely to increase significantly during a nine-week grading period when using overt/covert word-study strategies within an intervention bundle consisting of word-study, fluency, comprehension, computer-based, and motivational components.

Hypothesis 3 Results

The researcher hypothesized the use of outside-in word-study strategies had no impact on struggling adolescent readers' fluency scores. A paired samples *t*-test was conducted to compare the pretest and posttest fluency scores of students using outside-in word-study intervention strategies. There was a significant difference in the pretest scores (M= 140.5, SD=29.6) and posttest scores (M=159.6, SD=26.9) for fluency t (23) = -8.7, p= .00. The researcher rejected the null hypothesis. The results suggested that students' fluency could increase significantly during a nine-week period when using outside-in word-study strategies within an intervention bundle

consisting of word-study, fluency, comprehension, computer-based, and motivational components.

Hypothesis 4 Results

The researcher hypothesized the use of outside-in word-study strategies had no impact on struggling adolescent readers' comprehension scores. A paired samples *t*-test was conducted to compare the pretest and posttest comprehension scores of students using outside-in word-study strategies. There was no significant difference in the pretest scores (M= 513.9, SD=104.3) and posttest scores (M=531.5, SD=140.4) for comprehension t (23) =-.71, p= .45. The researcher accepted the null hypothesis. The results suggested that students' comprehension is unlikely to increase significantly during a nine-week period when using outside-in word-study strategies within an intervention bundle consisting of word-study, fluency, comprehension, computer-based, and motivational components.

Hypothesis 5 Results

The researcher hypothesized there was no difference in fluency scores of students receiving overt/covert word-study interventions compared to students receiving outside-in word-study interventions. An ANCOVA [between-subjects factor: intervention group (overt/covert, outside-in); covariate: fluency pretest score] revealed no main effects of intervention group, F (1, 44) = .69, p = .41, ηp^2 = .02, or fluency pretest score, F (1, 44) = 65.71, p = .00, ηp^2 = .60. The predicted main effect of intervention group was not significant, F (1, 44) = .69, p = .41, ηp^2 = .02. The researcher accepted the null hypothesis. As displayed in table 4.3, the results suggested although there was a significant difference in pretest scores F (1, 44) = 65.71, p = .00, there was no significant difference in the fluency posttest scores of students receiving overt/covert or outside-in word-study intervention strategies F (1, 44) = .69, p = .41.

Table 4

Tests of Between Subjects Effects I

Dependent Variable: Fluency Posttest

Source	Type III Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	26502[a]	2	13251.	33.3	.00	.60
Intercept	14569	1	14568	36.6	.00	.45
PRE	26147	1	26147	65.7	.00	.60
Group	273	1	273	.69	.41	.02
Error	17507	44	397			
Total	1201570	47				
Corrected Total	44008	46				

*$p < .05$

Hypothesis 6 Results

The researcher hypothesized there was no difference in the comprehension scores of students receiving overt/covert word-study strategies compared to students receiving outside-in word-study interventions. An ANCOVA [between-subjects factor: intervention group (overt/covert, outside-in); covariate: comprehension pretest score] revealed no main effects of intervention group, F (1, 44) = .30, p = .59, ηp^2 = .01, or comprehension pretest score, F (1, 44) = 33.95, p =

.00, ηp^2 = .44. The predicted main effect of intervention group was not significant, F (1, 44) = .30, p = .59, ηp^2 = .01. The researcher accepted the null hypothesis. As displayed in Table 4. 4, the results suggest although there is a significant difference in pretest scores F (1, 44) = 33.95, p = .00, there is no significant difference in the comprehension posttest scores of students receiving overt/covert or outside-in word-study intervention strategies F (1, 44) = .30, p = .59.

Table 5

Tests of Between Subjects Effects II

Dependent Variable: Comprehension Posttest

Source	Type III Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	292620[a]	2	146310	17.1	.00	.44
Intercept	23125	1	23125	2.7	.11	.06
PRE	290296	1	290296	33.9	.00	.44
Group	2591	1	2591	.30	.59	.01
Error	376275	44	8551			
Total	13602279	47				
Corrected Total	668895	46				

$p < .05$

Summary

After conducting paired samples *t*-tests and ANCOVA statistical analyses, the researcher rejected null hypotheses one and three and accepted null hypotheses two, four, five and six. Paired sample *t*-tests revealed significant differences in the fluency pretest and posttest scores of students using overt/covert or outside-in word-study intervention strategies; however, there was no significant difference in the comprehension scores of students using the overt/covert or outside-in word-study strategies. ANCOVA statistical analysis revealed no significant differences in the fluency or comprehension scores of students using overt/covert strategies compared to the fluency and comprehension scores of students using outside-in strategies. These results suggested students' fluency might increase when using overt/covert or outside-in word-study strategies within an intervention bundle including fluency, comprehension, computer-based, and motivational components during a nine-week period; however, students' comprehension scores might not increase significantly when using these strategies within an intervention bundle during a nine-week period. A discussion of the implications of these results is included in the following chapter.

CHAPTER 5

Discussion

As stated in the literature review, reading fluency and comprehension are dependent upon the reader's ability to decode and recognize words in texts (Hougen, 2014; Boardman et al., 2008; National Reading Panel, 2000; Hoover & Gough, 1990). Many struggling readers require word-study instructional interventions to aid them in decoding multisyllabic words in complex texts (Scammacca et al., 2015; Hougen, 2014; Moats, 2009; Boardman et al., 2008). The present study analyzed the impact of two different word-study instructional intervention strategies received by struggling adolescent readers. The purpose of analyzing the impact of the different word-study interventions was to fill gaps in adolescent literacy literature and add to existing research by comparing the comprehension and fluency scores of students using overt/covert word-study strategies (Archer et al., 2005) to the fluency and comprehension scores of students using the outside-in word-study strategy (Ebbers, 2011). The ultimate goal of this study was to continue existing research on effective word-study interventions for struggling adolescent readers and discover solutions that could provide students with tools to become proficient readers.

Summary of Findings

In this experimental study, participants were randomized to receive nine weeks of either overt/covert or outside-in word-study interventions after having their initial fluency and comprehension scores assessed using *easyCBM* fluency assessment and *Renaissance STAR*

Reader comprehension assessment. Participants' fluency and comprehension scores were also measured at the end of the nine-week intervention period, and paired *t*-tests and ANCOVA statistical analyses were conducted to test the researcher's hypotheses regarding the impact of the overt/covert or outside-in word study strategies on students' fluency and comprehension scores.

Fluency Findings. The researcher hypothesized the use of overt/covert or outside-in word-study strategies had no impact on struggling adolescent readers' fluency scores. Paired samples *t*-tests were conducted to compare the pretest and posttest fluency scores of students using overt/covert or outside-in word-study intervention strategies. The researcher found significant difference between the pretest and posttest fluency scores of students using either strategy. The results of this current study suggested that students' fluency could increase significantly during a nine-week period particularly when using overt/covert or outside-in word-study strategies within an intervention bundle consisting of word-study, fluency, comprehension, computer-based, and motivational components. These findings were consistent with Palumbo et al. (2015) and Carlisle & Stone (2005) who suggested struggling readers benefit from using word-study strategies to aid them in determining the sound, structures, and meanings of words. When students are able to determine the sounds, structures, and meanings of words, they have a greater chance of increasing their reading fluency (Hoing et al., 2013; Chard, Pikulski, & McDonagh, 2012; Rasinski, 2010; Barth, Catts, & Anthony, 2009; Vellutino et al., 2007; Catts & Weisment, 2006).

The researcher hypothesized there was no difference in the fluency scores of students receiving overt/covert word study interventions compared to students receiving outside-in word-study interventions. An ANCOVA [between-subjects factor: intervention group (overt/covert, or outside-in); covariate: fluency pretest score] revealed no main effects of intervention group. The predicted main effect of intervention group was not significant. This revealed participants'

fluency could increase significantly regardless of the word-study strategy instruction they received and supported the notion of teaching students either the overt/covert (Archer et al., 2005) or the outside-in (Ebbers, 2011) word-study strategy.

Comprehension Findings. The researcher hypothesized the use of overt/covert or outside-in word-study strategies had no impact on struggling adolescent readers' comprehension scores. Paired samples *t*-tests were conducted to compare the pretest and posttest comprehension scores of students using overt/covert or outside-in word-study strategies. There was no significant difference in the pretest scores and posttest scores for comprehension. The results of this current study suggested that students' comprehension scores were unlikely to increase significantly during a nine-week period when either using overt/covert or outside-in word-study strategies within an intervention bundle consisting of word-study, fluency, comprehension, computer-based, and motivational components. Although word-study strategy instruction may not have a direct impact on comprehension scores, word-study strategy instruction did impact fluency (Hoing et al., 2013; Chard, Pikulski, & McDonagh, 2012; Rasinski, 2010; Barth, Catts, & Anthony, 2009; Vellutino et al., 2007; Catts & Weisment, 2006) which could eventually impact comprehension by allowing readers to expend less cognitive energy on decoding words and more cognitive energy on comprehending text (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010;Wharton-McDonald & Swiger, 2009).

The researcher hypothesized there was no difference in the comprehension scores of students receiving overt/covert word-study interventions compared to students receiving outside-in word study interventions. An ANCOVA [between-subjects factor: intervention group (overt/covert, outside-in); covariate: comprehension pretest score] revealed no main effects of intervention group for comprehension and the predicted main effect of intervention group was not significant.

These findings revealed that overt/covert or outside-in word-study strategy instruction might not directly impact comprehension during a nine-week period; however, word-study strategy instruction positively impacted fluency which might possibly lead to future improvement in comprehension (Rasinski et al., 2011; Rasinski, 2010; Wharton-McDonald & Swiger, 2009).

Possible Explanations for the Findings

Prior studies provided possible explanations for the findings in this current study by noting the importance of word-study strategy instruction (Mullaney et al., 2014; Kundert et al., 2013; Graves et al., 2011; Vaughn et al., 2010; Shippen et al., 2005) and suggesting word-study strategy instruction plays a vital role in students' development of decoding skills that could lead to an increase in reading fluency and comprehension (Mullaney et al., 2014; Kundert et al., 2013; Graves et al., 2011; Vaughn et al., 2010; Shippen et al., 2005). Prior research also reports older struggling readers need instruction that focuses on multisyllabic word reading (Hougen, 2014; Ebbers, 2011; Ebbers & Denton, 2008; Archer et al., 2005). Many struggling adolescent readers, such as the participants in this current study, fall into the category of students needing multisyllabic word instruction (Christenbury et al., 2009; Torgesen, Houston Rissman, Decker, Roberts, Vaughn, & Lesaux, 2007). Researchers, Hasbrouck & Hougen (2014), Chard et al., (2012), Rasinski, Reutzel, Chard & Linan-Thompson, (2011) and Barth et al. (2009) reveal that intensive instruction in word-study strategies could produce significant changes in reading abilities by increasing reading fluency. Their findings possibly explain the reason participants' fluency increased in this current study regardless of the type of word-study strategy instruction they received.

Word-study strategy instruction yields effective results relating to fluency and comprehension when taught explicitly and systematically (Hougen, 2014; Honig et al., 2013;

Slavin et al., 2008). Participants in this study received explicit and systematic instruction on the overt/covert or outside-in strategies and demonstrated a significant increase in reading fluency. Researchers also imply that when reading fluency increases, students are able to develop automaticity, the ability to pronounce and/or understand the meanings of words automatically (Alvermann, Unrau, & Ruddell, 2013; Bhattacharya & Ehri, 2004), and devote more cognitive energy to comprehension (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010;Wharton-McDonald & Swiger, 2009). Although the participants in this current study did not demonstrate a significant increase in comprehension scores during the nine-week period, it is reasonable to infer that their significant increase in fluency could enable them to devote more cognitive energy to comprehension and positively impact future comprehension scores.

Implications and Practice

This study adds to the body of research surrounding interventions for struggling readers (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2012; Lovet et al., 2011; Edmonds et al., 2009; Slavin et al., 2008) and also supports the basis of the Simple View of Reading (Gough & Tumner, 1986) and the Reading Rope Model (Scarborough, 2001). This study supports the word recognition component of the SVR by focusing on strategies designed to teach students to decode multisyllabic words. The ultimate goal of the word-study strategy instruction component is to provide readers with the tools to decode words. Decoding words develops word recognition skills, which researchers propose could possibly increase fluency and comprehension abilities (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010; Wharton-McDonald & Swiger, 2009). Because struggling adolescent readers are generally deficient in word recognition, it is imperative to teach them

strategies to help them decode multisyllabic words (Honig et al., 2013; Chard et al., 2012; Rasinski et. al, 2011; Barth et al., 2009; Kirby & Salvage, 2008).

As readers develop their abilities to decode multisyllabic words, they should develop automaticity (Alvermann et al., 2013; Moats & Davidson, 2009; Bhattacharya & Ehri, 2004). Once reading fluency increases via automaticity, readers are able to devote less cognitive energy toward decoding and more cognitive energy toward comprehension (Moats & Hennessy, 2009; Rasinski et al., 2011; Rasinski, 2010;Wharton-McDonald & Swiger; 2009). The results of the current study supported that the word recognition component of the SVR positively impacted participants' fluency scores. This current study reveals that word-study strategy instruction may significantly impact students' fluency in a nine-week period; however, more time is required to potentially increase students' comprehension scores.

This study also supports Scarborough's (2001) Rope Model theoretical construct of reading because readers use word recognition skills (phonological awareness, decoding, and sight recognition) in addition to language comprehension skills (background knowledge, vocabulary knowledge, language structures, verbal reasoning, and literacy knowledge) to strive to become skilled readers. The Rope Model stresses the intertwining of word recognition and language comprehension skills to produce skilled reading consisting of fluent reading and comprehension of texts. This study focused on the usage of two word-study strategies to increase students' word recognition skills. Because participants' fluency increased significantly using either overt/covert or outside-in strategies, the researcher concludes that word-study strategy instruction has the potential to help build the fluency bridge that connects decoding and comprehension. With more time and intervention, students' comprehension has the potential to

improve as well (Scammacca et al., 2015; Hougen, 2014; Solis et al., 2014; Wanzek et al., 2013; Vaughn et al., 2012; Lovett et al., 2011; Edmonds et. al., 2009; Boardman et al., 2008).

In addition to adding to the body of research surrounding interventions for struggling readers and supporting the basis of the SVR (Gough & Tumner, 1986) and Reading Rope Model (Scarborough, 2001), this study offers several practical applications for educators. Practitioners may provide students with overt/covert or outside-in word-study strategy instruction within an intervention bundle consisting of fluency, comprehension, computer-based, and motivational components as a method to improve students' word recognition skills and potentially increase students' fluency and comprehension measures. Because no significant difference was detected between the pretest and posttest fluency and comprehension scores of students receiving either strategy, teachers, interventionists, or reading specialists might consider implementing either or both strategies within an intervention bundle. When implementing both strategies, educators might consider teaching the overt/covert strategy followed by the outside-in strategy because the overt/covert strategy focuses primarily on word division while the outside-in strategy involves word division and the use of morphological and context clues. Use of either or both strategies could potentially impact students' fluency and comprehension by providing them with tools to enhance their word recognition skills.

Limitations of the Study

The study has several limitations including the sample size, the research site, the length of the data collection period, the knowledge of the one administering the word-study instructional strategy interventions, and the administration of the pretest and posttest fluency and comprehension assessments by the researcher. The sample consists of one group of adolescent readers in a rural North Mississippi school, which may not be representative of all of the students

and schools in Mississippi and the rest of the United States. Since data collection spans a nine-week period, results may vary if information was collected over a longer or shorter period. The researcher administered the pretest and posttest assessments. This is a limitation because the researcher was aware of the type of word-study intervention each participant received. Researchers must ensure that awareness of intervention group assignment (overt/covert or outside-in) does not interfere with the proper administration of assessments to guarantee that valid results are obtained. Additionally, the knowledge and proficiency of the one administering the word-study strategy instructional interventions could impact participants' performance because proficient knowledge in administering the overt/covert and outside-in word-study instructional strategy interventions is necessary for students to receive quality instruction to master the word-study skills. It is important to note that the word-study strategy interventions in the current study were administered by a trained reading interventionist who had thoroughly researched and practiced providing overt/covert and outside-in word-study strategy instruction. Failure to provide quality instruction could negatively impact student performance due to their inability to obtain adequate knowledge of word-study strategies. Future researchers must ensure that interventions are provided by one who is knowledgeable and able to provide quality word-study interventions.

Recommendations for Future Research

This study adds to scholarly research by providing additional information on the effectiveness of the overt/covert and outside-in word-study interventions. In addition, the study could improve teaching practice by offering information regarding the overt/covert and outside-in word-study strategies and provide educators with useful information regarding effective interventions for struggling readers. Based upon the results of this study, educators might

consider implementing a bundled intervention approach consisting of word-study, fluency, comprehension, computer-based, and motivational components. When selecting the appropriate word-study strategy to implement, instructors could consider either overt/covert or outside-in word-study instructional strategies to significantly increase readers' fluency.

Future researchers could address the limitations in this study by using a larger sample size and/or including multiple schools in the study. Researchers might conduct the study over a longer period of time to discover if comprehension is significantly impacted when students receive word-study strategy instruction for more than nine weeks. Investigators might also consider implementing a control group to determine if students' fluency still increases significantly without the word-study strategy component. Researchers may possibly manipulate other components of the intervention bundle by using a different computer-based program or motivational component with the overt/covert or outside-in word-study strategy instruction to determine if students' fluency and/or comprehension measures change significantly.

Regardless of the direction future researchers take with the results of this study, it is important to note that word-study strategy instruction appears to be a viable component within an intervention bundle. By implementing an effective intervention bundle, educational practitioners have a greater chance of helping struggling readers learn the necessary strategies to improve their fluency and comprehension skills. When struggling readers' comprehension abilities improve, they have greater possibilities of experiencing academic achievement. When more struggling readers experience academic achievement, they are more likely to finish high school and possibly increase their opportunities for post graduate success (Waldman, 2016; Adams, 2015; Hirsh, 2013; Amos, 2015; Joseph & Schlier, 2008).

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VITA

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Education

Master of Education (Curriculum and Instruction)	University of Mississippi	2008
Bachelor's of Education (Elementary Education)	University of Mississippi	2006

Certification

National Board Certification- Early through Middle Childhood Literacy

Experience

MTSS Coordinator/Interventionist Water Valley High School	Water Valley, MS	2016-Present
Science Teacher (7^{th}-8^{th} Grade) Water Valley High School	Water Valley, MS	2013-2016
Events and Reading Program Coordinator/Volunteer Drakeford Center for Empowerment	Water Valley, MS	2014-2015
ELA Teacher (6^{th} Grade) Davidson Elementary School	Water Valley, MS	2006-2013

Awards/Honors

Water Valley High School Teacher of the Year (2014-2015) and (2015-2016)

Water Valley School District Teacher of the Year (2015-2016)

Lisa Mullins Reading Award (2016)

Certificate of Recognition for 8^{th} Grade Reading Initiative (October 2015)

Phi Kappa Phi Honor Society Initiation (2015)